The Dissertation Committee for Maria Nicholaevna Fishel Certifies that this is the approved version of the following dissertation:

Cognitive Content Specificity of Test Anxiety and Depression in College Women

Committee:

Deborah Tharinger, Supervisor

Diane Schallert

Barbara Dodd

Chris McCarthy

Carole Holahan

Cognitive Content Specificity of Test Anxiety and Depression in College Women

by

Maria Nicholaevna Fishel, B.A., M.A.

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Dedication

To my husband Clark

For helping me reach the heights I did not know I could reach and letting me become a person I have always wanted to become.

Your steadfast love, devotion, support, caring, und an unwavering belief in my ability helped guide me through the tough times and bring this project to completion.

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Cognitive Content Specificity of Test Anxiety and Depression in College Women

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Maria Nicholaevna Fishel, Ph.D.

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Supervisor: Deborah Tharinger

Anxiety and depression are debilitating disorders that often co-occur. Their differentiation has important ramifications for theory and treatment. Beck's (1976) Cognitive Content Specificity (CCS) hypothesis proposes that depression and anxiety are characterized by unique cognitive profiles that should be reflected, among other variables, in their cognitions. Further, the Balanced States of Mind model (BSOM; Schwartz, 1997) asserts that the cognitive ratio of positive to the sum of positive and negative cognitions is implicated in distinguishing various levels of pathology from optimal functioning. The present study used a cross-sectional design to compare the differentiating abilities of the CCS hypothesis and the joint CCS/BSOM model by examining depression and test anxiety-relevant positive and negative cognitions separately versus the BSOM cognitive ratios. Additionally, the specific interval predictions of the BSOM model were tested for test anxiety and depressive content. Four

groups of college women were selected from a larger sample of college women from a large public university: Depressed (n = 51), Test Anxious (n = 51), "Mixed" Depressed and Test Anxious (n = 51), and Control (n = 51). Findings indicated that the Depressed Group differed from Test Anxious Group on test anxious and depressive negative cognitions and BSOM ratios. Consistent with previous literature, positive anxious content yielded less specificity, as it failed to discriminate between test anxious and depressed groups. While the "Mixed" group was most dysfunctional, Controls showed a least dysfunctional cognitive profile on both cognitions and cognitive ratios. Thus, the quantitative parameters of the BSOM model with varying content were partially validated, with depressive content not fitting the predictions as well as test anxious content. Results support the integration of the CCS and BSOM models and the use of a specific anxiety disorder (i.e., test anxiety) as ways to improve depression-anxiety differentiation in nonclinical populations. Theoretical and treatment implications are highlighted, and limitations are discussed.

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CHAPTER 1

INTRODUCTION

Although usually adaptive in everyday life at short term and mild levels, if prolonged and severe, anxiety and depression can be debilitating conditions affecting both youths and adults. Depression and anxiety are prevalent in clinical as well as nonclinical populations and are found to occur more frequently in women than men, although almost equally in boys and girls (Mash & Barkley, 1996). Both anxiety and depression are challenging to conceptualize, as they can be viewed as moods, symptoms, syndromes (i.e., clusters of symptoms), or clinical disorders (i.e., syndromes with the additional criteria of frequency, severity, and length).

Clinical disorders of anxiety and depression differ in their etiology, epidemiology, symptomatology, course, and correlates. However, it has been noted that clinically-defined symptoms of anxiety disorders (e.g., difficulty concentrating, social withdrawal, fatigue, sleep disturbance) overlap with those of depressive disorders (*Diagnostic and Statistical Manual - Text Revision, 4th ed.,* 2000). Furthermore, individuals with anxiety disorders have a high likelihood of having a coexisting, or comorbid depressive disorder and vice versa. *Comorbidity* is the co-occurrence of a disorder or condition in an individual with another psychological or medical condition. Clinical comorbidity rates of depression and anxiety disorders run as high as 60% (Brown & Barlow, 1992; Levine, Cole, Chengappa, & Gershon, 2001). Furthermore, self-report measures of anxious and depressive symptoms show relatively high intercorrelations in both referred and nonreferred populations (Dobson, 1985; Gotlib, 1984; Tanaka-Mitsumi & Kameoka, 1986).

Scholars in the field have argued about the nature of the connection between anxiety and depression since the early days of psychology. At present, it is widely agreed that anxiety and depression have some aspects in common, yet each has some

characteristics that seem to be distinct. Therefore, in addition to explaining the occurring overlap, a particularly relevant task in conceptualizating the anxiety-depression relationship is to determine their specificity by finding the unique features of each. Such differentiation has important benefits for theory, research, identification, and treatment of the conditions.

Both depression and anxiety have strong physiological, cognitive, emotional and behavioral underpinnings, and there have been many attempts to explain their connection from various perspectives. However, it is cognitive theorists who have provided some of the most widely used and detailed explanations of the anxiety-depression connection. Cognitive theory postulates that cognitions mediate emotions and behavior and that cognitive factors are at the core of psychopathology. Many cognitive models of psychopathology assert that a biased cognitive system (i.e., cognitive structures, processes, and products) is an intrinsic part of the etiology and maintenance of the disorder and that emotional and behavioral responses are mediated by cognitive processes. Automatic thoughts are one cognitive construct that has been widely used in models attempting to differentiate between pathology and normalcy and between various disorders (D.A. Clark & Beck, 1989).

Compared to those free of pathology, individuals with signs of abnormal functioning are hypothesized to show distortions in their thinking, including frequency (how often they think maladaptive thoughts), *valence* (how negative or positive the thoughts are), and *content* (dominant themes). The bulk of cognitive research investigating automatic thoughts has focused on valence. Negative thoughts have received the most empirical support for their role in psychological disorders and for helping differentiate between adaptive and maladaptive conditions. In fact, negative thinking has been a central topic of several influential models of psychopathology (e.g., Allport, 1937; A.T. Beck, 1976; Ellis, 1962, 1977) and is viewed by some as inherent in brain patterns (Gilbert, 1998). Positive thoughts are also considered relevant to psychopathology, as they are commonly seen enhancing well-being and helping people

cope with stress and adversity. Typically, excess or deficiency of positive or negative cognitions has been viewed as dysfunctional.

In addition to cognitive theory, social psychology and mathematical psychology have also uniquely contributed to a conceptualization of psychopathology and the cognition-affect relationship by providing a concept of '*balance*'. Within a balance framework, significant deviation from an optimal set point is considered maladaptive. Therefore, psychopathology is not gauged as presence or absence of certain symptoms but as relative to a stable numeric cognitive-affective balance point. In accordance with this notion, Robert Schwartz and his colleagues proposed the *States of Mind* (SOM) model (Schwartz & Garamoni, 1986, 1989), which was later reformulated and termed the *Balanced States of Mind* (BSOM) model (Schwartz, 1997). This model specifies theory-based precise set-points and intervals for the normal, pathological, and optimal functioning. The ratios delineating intervals equal to a proportion of positive cognitions in a sum of both negative and positive cognitions.

For several decades, cognitive scholars have made and tested predictions regarding differentiation between anxiety and depression based on the elements of their cognitive systems, including automatic cognitions. Much of the research has focused on Aaron Beck's cognitive content specificity hypothesis, which suggests that cognitive profiles of anxiety and depression differ, among other things, in themes of their respective thoughts, i.e., loss and deprivation content in depression and threat content in anxiety (A.T. Beck, 1976). Additionally, in his cognitive theory of depression, Beck (A.T. Beck & Rush, 1978; A.T. Beck et al., 1979) hypothesized that depressed individuals have relatively more negative thoughts about self, the world, and the future, and relatively less positive cognitions, compared to other disorders, such as anxiety.

Although a few studies substantiated original content specificity claims in terms of cognitive themes in depression and anxiety (e.g., A.T. Beck, et al., 1987; D.A. Clark, Beck, & Brown, 1989), the uniqueness of depressive negative content did not gain wide support. Specifically, depression and various types of anxiety have been both associated

with high negative thinking when compared to a lack of psychopathology (Beidel, Turner, & Dancu, 1985; Blankstein, Flett, Boase, & Toner, 1991; Bruch, Kaflowitz, & Kuethe, 1986; Crandell & Chambless, 1986; Dobson & Shaw, 1986; Harrel & Ryon, 1983; Kendall & Hollon, 1989; Ross, Gottfredson, Christensen, & Weaver, 1986). Moreover, negativity of affect has been found to be specific to depression but to distressed individuals in general (e.g., D.A. Clark, Steer, Beck, 1994; Steer, Clark, Beck, & Ranieri, 1995). The tripartite model proposed by L.A. Clark and Watson (1991) explained those findings by suggesting that depression and anxiety share a basic common factor of negative affectivity, which results in high frequency of negative cognitions. Low positive affectivity and low frequency of positive cognitions are viewed as unique to depression; high physiological arousal is seen as unique to anxiety. There has been some empirical support for the cognitive predictions of the tripartite model (R. Beck, Benedict, & Winkler, 2003; R. Beck et al., 2001; D.A. Clark, Steer, & Beck, 1994; Jolly, Dyck, Kramer, & Wherry, 1994; Jolly & Kramer, 1994; McKellar, Malcarne, & Ingram, 1996). However, despite extensive testing, neither Beck's model nor the tripartite model alone has garnered unequivocal empirical backing. Evidence of specificity has been stronger for depression than anxiety, for adults rather than children or adolescents, and for psychiatric populations rather than nonclinical populations.

Ambiguity in empirical findings has prompted researchers to investigate alternative ways of looking for cognitive content specificity of anxiety and depression via integration of different models (e.g., R. Beck et al., 2001; Mineka, Watson, & Clark, 1998; Ronan & Kendall, 1997). Although the BSOM model has not been tested extensively within the context of cognitive specificity, it lends itself to specific predictions and can be utilized for cognitive content differentiation. Preliminary evidence supports this integration (Calvete, Estévez, Landín et al., 2005).

In addition, cognitive researchers have speculated that since specific anxiety disorders and maladaptive states (e.g., test anxiety) exhibit less comorbidity with depression than more generalized forms of anxiety, using specific types of anxiety may

contribute to successful anxiety-depression differentiation (Ingram, Kendall, Smith, Donnell, & Ronan, 1987). As a syndrome, test anxiety shares several cognitive components with depression, including frequent negative thoughts and infrequent positive thoughts. Although specificity of depression and several anxiety disorders has been addressed in many studies (Bruch, Mattia, Heimberg, & Holt, 1993; Cho & Telch, 2005; Woody, Taylor, & McLean, 1998), the relationship between test anxiety and depression has received little attention from empirical researchers (for exceptions, see Ingram et al., 1987; Sanz & Avia, 1994).

The current dissertation study was designed to address the limitations in the current body of literature and aimed to establish whether integrating the BSOM model with CCS models would prove a useful aid in differentiating test anxiety from depression. The study investigated cognitive content specificity of test anxiety and depression in nonclinical college women by testing syndrome-specific cognitive content alone versus the BSOM ratios of positive and negative cognitions. Additionally, the predictions of the BSOM model regarding specific ratio intervals were examined.

CHAPTER 2

REVIEW OF THE LITERATURE

To help the reader better understand the theoretical underpinnings driving the study, first, issues in the relationship between psychopathological conditions are reviewed. Second, conceptualization of anxiety and depression, followed by the discussion on how to view the link between them is presented. An overview of the cognitive system in psychopathology in general and anxiety and depression in particular follows. More specifically, the role of cognitive system components, particularly automatic thoughts, in anxiety and depression are explored. Further, the content specificity issues in anxiety and depression are addressed and the models accounting for specific aspects of the two conditions are summarized. Empirical evidence to support the cognitive content specificity hypothesis in anxiety disorders and depression is then examined. Finally, test anxiety is introduced as a syndrome showing specificity within the class of anxiety disorders. Relevant issues including conceptualization, cognitive system, and empirical research within the framework of specificity models are covered throughout.

2.1 Capturing the Relationship between Maladaptive States

It has been noted that many frequently-occurring psychopathological states have common features and a person diagnosed with one psychiatric disorder is likely to exhibit one or several comorbid maladaptive conditions (L.A. Clark, Watson, & Reynolds, 1995; Lilienfeld, Waldman, & Israel, 1995). Youths often manifest co-occurring maladaptive affective and behavioral conditions (Mash & Barkley, 1996) but adults, including college students, have also been found to have high comorbidity rates (Gotlib, 1984; Rosenthal & Schreiner, 2000). Discussion of comorbidity is relevant to the topic of conceptualizing a relationship between psychological disorders or maladaptive states.

Comorbidity in psychopathology may be real or an artifact of methodology (Ingram, 1989a). True comorbidity may reflect the fact that overlapping conditions both theoretically and empirically represent interrelated affective states with co-occurring cognitive, physiological, and motivational symptoms (Ingram, 1989b), same or similar etiology and concomitants, or one disorder may serve as a risk factor for the other one (D.A. Clark et al., 1999; Watson & Kendall, 1989). Some argue that the overlap can be explained by methodological limitations and fuzziness in the diagnostic criteria. Current empirical data indicate that comorbidity of psychological disorders cannot be solely attributed to methodological issues or to chance (Widiger & Clark, 2000). There is emerging evidence that both genetic and environmental factors (e.g., childhood and adult adversity) are responsible for the frequently observed co-occurrence both directly (e.g., as a common risk factor) and indirectly (e.g., through their influence on prevalence) (Widiger & Clark).

The issue of comorbidity is further complicated by a lack of theoretical consensus in conceptualization of psychopathological states, which can be seen as continuous or categorical variables. The medical model, exemplified by the *DSM-IV-TR* of the American Psychiatric Association (2000), adheres to a *categorical* view. From a clinical perspective, comorbidity means an overlap of not just symptoms of the disorders but, more importantly, of their diagnoses (D.A. Clark, Beck, & Alford, 1999). Comorbidity of clinically-defined disorders and resulting validity issues have given an impetus for the growing wave of dissatisfaction with the categorical nosology, despite its wide use for diagnosis, especially in the light of development of the new edition of the *DSM* (Trull & Durrett, 2005; Watson, 2005; Widiger & Clark, 2000). The dichotomous diagnostic system (either meeting the threshold criteria or not) prohibits one from identifying conditions that are not as severe, i.e., subclinical or prodromal. It also results in lower comorbidity rates, as some symptoms are frequently subsumed by several disorders (Brown & Barlow, 1992). It does, however, allow for some flexibility associated with the dimensional view, as a pathological condition is also distinguished from the normal one

on the basis of intractability, pervasiveness, and the degree of interference with daily routine (Mash & Barkley, 1996) and there is no assumption that each category within the manual is discrete (*DSM-IV-TR*, 2000).

Dimensional classifications of psychopathology (Achenbach, 1993; Frances, Widiger, & Fyer, 1990) are currently gaining momentum. Advocates of the *dimensional* approach place disorders on a continuum, with a low level of disorder expression (associated with adaptive functioning) on one end and severe manifestation of the condition (associated with psychopathology) on the other. Opponents of the categorical model have made a convincing argument, citing the many limitations of the categorical approach, such as extensive diagnostic co-occurrence, inadequate diagnostic coverage (whereby some conditions are not adequately captured by categories), arbitrary nature of boundaries between pathological and "normal" functioning, and heterogeneity among people with the same diagnosis (see Widiger & Trull, 2007, for a review). Although it is possible that an optimal system lies somewhere in between (Mash & Barkley, 1996), it has been recommended that future editions of the *DSM* strive to move towards categorical dimensions by developing "meaningful quantitative points of demarcation along more continuous distributions of functioning (Widiger & Clark, 2000, p.950

Due to the recent findings of comorbidity between various psychological disorders, it has become apparent that many variables previously believed to be specific to a particular disorder may no longer be considered unique. Therefore, theorists and researchers have been searching for the ways to capture not only commonalties across psychopathology but, more importantly, critical features of the disorder that are typical of that disorder and not typical of the others (i.e., specificity). The knowledge of factors that contribute to the unique variance in specific disorders has important implications because it is essential for the understanding of their "etiology, course, exacerbation, and, eventually, alleviation" (Bruch et al., 1993, p. 3). Among various maladaptive conditions that demonstrate a high level of comorbidity are depression and anxiety. The relationship between the two has been a basis for many models and has generated much research.

Before addressing their connection, the concepts of anxiety and depression are introduced. Their course, prevalence, and differences in manifestation between men and women also are discussed.

2.2 Anxiety

2.2.1 Conceptualization

It is not by chance that the twentieth century was named the age of anxiety. The interest towards the anxiety phenomenon is not likely to wane in the twenty-first century. Anxiety is a basic human emotion and, as such, has a great appeal to scientists, clinicians, and lay people alike. Although it is widely agreed that anxious reactions may at times be adaptive and are involved in the primal mechanisms that help people survive in a threatening environment, consistent exaggeration of the existing danger is likely to cause severe impairment of the everyday functioning.

As an affect, anxiety may accompany most psychological disorders. In addition to being viewed as an affect, anxiety is viewed as a symptom, syndrome, and a clinical disorder. It becomes a symptom leading to a syndrome or a disorder only when objectively uncomfortable or is perceived to be out of control (Julien, 2001). Anxiety disorders are a genetically-diverse group (Mineka, Watson, & Clark, 1998). *DSM-IV-TR* (2000) lists two anxiety syndromes, i.e., agoraphobia (anxiety about or avoidance of places or situations from which escape might be difficult) and panic attack (a period of the sudden onset of intense fear associated with impending doom, characterized by shortness of breath, chest pain, choking sensations, and fear of going crazy or losing control). Both are used to diagnose the following common adult clinical anxiety disorders: (1) *panic disorder* (PD) with or without agoraphobia (i.e., recurrent unexpected panic attacks with or without agoraphobia symptoms); (2) *agoraphobia* without history of panic disorder; (3) *specific phobia* (i.e., anxiety provoked by exposure to a specific fear object or situation); (4) *social phobia* (i.e., anxiety provoked by exposure to social or performance situations); (5) *obsessive-compulsive disorder* or OCD (characterized by obsessions and compulsions that serve to neutralize anxiety); (6) *posttraumatic stress*

disorder or PTSD (re-experiencing a traumatic event accompanied by increased arousal); and (7) *generalized anxiety disorder* or GAD (at least 6 months of persistent and excessive anxiety). Clinical classification of anxiety reflects diversity of its expression but fails to entirely capture its nature. The construct of anxiety has been subject to a debate of proponents of dimensional and categorical views discussed above. Current evidence seems to point to the benefits of a continuity hypothesis (Flett, Vredenberg, & Krames, 1997; cited in Endler & Kocovski, 2001).

Moreover, anxiety is an ambiguous construct, having been defined as a state, a trait, a drive, a motive, a stimulus, and a response (Endler & Kocovski, 2001). Anxiety is widely believed to have physiological (autonomic arousal), cognitive (thoughts about danger), emotional (feelings of fear, dread, apprehension), motivational, and behavioral (escape/avoidance) components. Another vivid example of heterogeneity of anxiety is its trait and state distinction. A trait is a "generalized and enduring predisposition to react to many situations in a consistent manner" (Endler & Kocovski, 2001, p. 233). In contrast to trait anxiety, state anxiety is anxiety in a specific situation, which is usually transient and varies depending on circumstances. Researchers acknowledge that both state and trait components, as well as their interaction, may cause significant impairment in an individual's functioning (Spielberger & Vagg, 1995).

Research in anxiety and anxiety disorders has been prolific. Theories of general anxiety have been too numerous to list them all and represent various schools of thought, e.g., psychodynamic, personality, learning, social, motivational, and cognitive-behavioral. Examples of notable theoretical contributions to the field of anxiety feature Freud (1924), Allport (1937), Spielberger (1975), Eysenck (1979, 1992, 1997), Endler (1975, 1983; Endler & Magnusson, 1976), and Barlow (1988). Most recent theories of anxiety use a transactional or integrative approach to accommodate for the multifaceted nature of the phenomenon (Endler, 1997; Endler, Crooks, & Parker, 1992). However, due to the complexity of anxiety, there is still much to be learned about how it affects our well-being.

2.2.2 Prevalence and Course of Anxiety

Anxiety disorders are some of the most widespread psychological disorders in young people and adults. Although a few childhood-onset anxiety or anxiety-related disorders (e.g., separation anxiety disorder, selective mutism) typically resolve themselves by adolescence, most anxiety conditions often persist throughout later years. The prevalence and course of different adult anxiety disorders vary considerably. The start of panic disorder is typically between late adolescence and mid-40s. Specific phobias are thought to start in early childhood or adolescence. Social phobia starts in early to middle adolescence. OCD is less frequent and is found to typically manifest itself in adolescence or early adulthood. PTSD can occur at any age, with a wide variation in the duration of symptoms. Generalized anxiety disorder is chronic and generally begins in childhood and adolescence (*DSM-IV-TR*, 2000).

Most community studies with adults report the following lifetime prevalence of clinical anxiety disorders: PD – 1% - 3.5%; agoraphobia without PD – 5.3%; specific phobia (depending on the study's criteria for selection and the type of phobia) – 7.2% - 11.3%; social phobia – 3% - 13%; PTSD – 8%; and GAD – 5% (Mackinaw-Koons & Vasey, 2000; Parker & Hadzi-Pavlovic, 2001). One-year prevalence is as follows: PD – 0.5% - 1.5% (with much higher prevalence, up to 60%, reported in clinical populations); specific phobias – 4% - 8.8%; and GAD – 3% *(DSM-IV-TR*, 2000; Mackinaw-Koons & Vasey, 2000). The overall rate of nonclinical generalized anxiety symptoms appears to be high in college populations. In Rosenthal and Schreiner's (2000) study of an ethnically-diverse student sample, 7.3% of surveyed participants in an urban college reported a high level of anxiety, while more than half of the sample (51.8%) endorsed at least moderate levels of anxiety.

2.2.3 Sex Differences in Anxiety

Before the differences in anxiety between men and women can be addressed, the author must clarify that in this manuscript, the term '*sex differences*' (which is described

as a "biological distinction" in the *Publication Manual of the American Psychological Association*, APA, 1997, p. 47) will be used rather than '*gender differences*'. This does not, however, imply that the observed differences are always biological in nature (Mackinaw-Koons & Vasey, 2000).

Anxiety symptoms and anxiety disorders are frequently documented to be more common among women than men. On self-report measures of anxious symptoms, girls consistently score higher and endorse more cognitive anxiety symptoms than boys, as well as more general and specific symptoms (e.g., social evaluative concerns). This trend is similar across cultures and continues into adulthood (Mackinaw-Koons & Vasey, 2000). Sex differences in clinical anxiety disorders have also been found. Most community lifetime prevalence rates and incidence samples across the globe show a preponderance of adult women over men in the following: GAD (more so in adolescence, 3:1, and less in adulthood, 1.5:1, although with significant variations across cultures); PD with or without agoraphobia and specific phobias (possibly 2-3 times more frequent in women than in men, averaging 1.63 across cultures); agoraphobia without history of PD; social phobia (more pronounced differences exist in childhood but tend to disappear in adulthood); and PTSD (*DSM-IV-TR*, 2000; Gater et al., 1998; Mackinaw-Koons & Vasey). Finally, empirical investigations of OCD have yielded inconsistent results, with more recent data pointing to sex differences in adulthood rather than occurring equally among men and women (*DSM-IV-TR*, 2000; Mackinaw-Koons & Vasey). A review of research with college students by Rosenthal and Schreiner (2000) yielded ambiguous results, with women either reporting higher anxiety than men on self-report measures or not manifesting any differences. In their own sample, college women had significantly higher anxiety scores than men, but the magnitude of sex differences was small (Rosenthal & Schreiner).

Psychosocial variables, such as social support, self-esteem, and coping skills, do not seem to contribute substantially to the sex disparities (Lewinsohn**,** Gotlib, Lewinsohn**,** Seeley, & Allen, 1998). However, differences in parental control (e.g., overprotection)

may be related to differential anxiety manifestation (Rapee, 1997). Additionally, researchers note that sex differences in anxiety are at least partially due to the social desirability factor, i.e., males being less willing to report anxiety (Mackinaw-Koons & Vasey, 2000). Further, the impairment in girls reporting high levels of anxiety may not be as high as that of boys reporting similar levels, yielding a possibility of differential interpretation of anxiety across sexes (Mackinaw-Koons & Vasey).

2.2.4 Summary

Anxiety evidences diversity in expression and, therefore, is difficult to measure and conceptualize. It has state and trait components, as well as cognitive, physiological, behavioral, and emotional aspects. Anxiety is as the core of several clinical disorders. As an affect and as a symptom, anxiety is widespread in general population, including college students. When maladaptive, anxiety can lead to the development of anxiety disorders. On the average, girls and women report higher levels of general and specific anxiety symptoms and have higher rates of most clinical anxiety disorders than boys and men, making anxiety disorders prevalent across life span. In college students, however, sex differences have not received consistent support, although a trend of women scoring higher than men on anxiety measures is frequently observed.

2.3 Depression

2.3.1 Conceptualization

Depression, which is often considered the most common of all psychological disorders, causes serious impairment in the overall functioning of children and adults alike (Gotlib, Roberts, & Gilboa, 1996). Similar to anxiety, various meanings of depression have been proposed, i.e., a normal mood state that can turn into a pathological one, a symptom, a syndrome involving related non-mood symptoms, and a diagnostic entity (L.A. Clark & Watson, 1991; Hollon & Kendall, 1980). Depression has cognitive (e.g., thoughts of loss), affective (e.g., sad mood), behavioral (e.g., regression, withdrawal), and physiological (parasympathetic system activation) components.

Depressive or sad mood is a universal experience that lies within the normal broad range of emotion (D.A. Clark et al., 1999) and can be viewed as typical under some circumstances, such as significant loss (e.g., loss of a job or loss of a loved one).

Depressive disorders in the *DSM-IV-TR* (2000) belong to a category of mood disorders. The two essential types of depressive disorders are *major depressive disorder* (MDD) and *dysthymic disorder* (DD). The term 'depressive episode' is a syndromal definition of depression and is used for a diagnosis of major depression, if certain symptoms last for a two-week period. A depressive episode, in addition to depressed mood, encompasses a loss of pleasure in almost all daily activities (whereby an individual cannot experience positive moods, even when good things happen, i.e., *anhedonia*), weight fluctuation/appetite and appetite disturbance, sleep disturbance, fatigue, feelings of worthlessness, difficulties in thinking and concentration, psychomotor agitation or retardation, and suicidal ideation or attempts (*DSM-IV-TR,* 2000). To meet the criteria for dysthymia, one has to have a depressed mood most of the day for more days than not, for at least two years. Also, other symptoms, e.g., appetite disturbance, sleep disturbance, low energy, low self-esteem, poor concentration, and feelings of hopelessness must be present. Dysthymia sometimes co-occurs with major depression (a combination known as 'double depression').

It must be noted that in the *DSM-IV*, disorders that involve cyclical depressive affect that is associated with another affect (i.e., bipolar depression) are conceptualized differently from those involving depressive affect only (i.e., unipolar depression). In this manuscript, only *unipolar* expression of depression will be considered. Additionally, the term 'dysphoria' (not to be confused with 'dysthymia') is sometimes used in clinical literature. *Dysphoria* is not a clinical disorder but rather a feature or symptom of many psychiatric disorders, including anxiety disorders and mood disorders. It is typically described as an unpleasant or uncomfortable mood, such as sadness (depressed mood) mixed with anxiety, irritability, or restlessness (retrieved February 26, 2007, from http://www.answers.com/topic/dysphoria). It is also commonly associated with low-level

or subclinical pathology. Gotlib (1984) proposed to use the terms 'dysphoria', 'malaise', and 'general psychological distress' interchangeably.

Depression has been widely viewed as a recurrent state (Dobson, 1985), although there exists a much disputed category of a Depressive Personality Disorder (DPD, included in the *DSM-IV-TR*, 2000 appendix). Additionally, some believe syndrome depression to be relatively homogeneous, especially compared to anxiety (e.g., A.T. Beck et al., 2003), whereas others think that it has many facets and should be subtyped (e.g., Keller & Nesse, 2006; Weissenberger & Rush, 1996). The current *DSM* version makes an attempt to differentiate between the subtypes of depression, e.g., melancholic versus non-melancholic and typical versus atypical. Additionally, the *DSM-IV-TR* appendix incorporates several conditions with a mood (depression) component that need further study (e.g., minor depressive disorder, recurrent brief depressive disorder, and premenstrual dysphoric disorder). There have been attempts to further differentiate between the types of depression beyond the *DSM* classification, e.g., endogenous (biologically-based) versus reactive (event-activated) (Beckham et al., 1995; Weissenberger & Rush, 1996); state versus trait (Endler, Macrodimitris, & Kocovski, 2000); somatic (Silverstein, 1999, 2002; both cited in Halbreich & Kahn, 2007); and hopelessness depression (Abramson, Metalsky, & Alloy, 1989).

Proponents of the dimensional view contend that depression occurs along a continuum and it is appropriate to use nonclinical samples to examine it (Flett, Hewitt, Endler, & Bagby, 1995; Vredenberg et al., 1993; cited in Endler et al., 1998). Syndrome severity has been proposed as a distinguishing factor in depression (e.g., Sullivan, Kessler, & Kendler, 1998). Depression has been a popular subject of many models and empirical studies. One of the most influential approaches to its understanding has been based on a cognitive theory, drawing on the writings of A. Beck (1967, 1976), Ellis (1962), and Seligman (1975) and his colleagues (e.g., Abramson, Seligman, & Teasdale, 1978; Abramson, Metalsky, & Alloy, 1989).

2.3.2 Prevalence and Course of Depression

Depression is highly prevalent among adolescents and adults. Dysthymia typically starts in late childhood/early adolescence or appears later in life, as remittance of the major depressive disorder. MDD can start at any age, with most cases starting in early adulthood (*DSM-IV-TR*, 2000). The available longitudinal research suggests that depressive episodes in youths remit, yet tend to be of longer duration than those of adults, with children suffering from relapses and persistent dysfunction (Kovacs, 1996; Nolen-Hoeksema, Girgus, & Seligman, 1986).

Although most agree that depression is often transient, if untreated, it can assume a chronic course (Segal & Dobson, 1992), result into serious maladjustment, and lead to suicide (McDermott, Hawkins, Littlefield, & Murray, 1989). Kaelber, Moul, and Farmer (1995) note that nearly 30% of people in general population may experience depressive symptoms for at least two weeks throughout their lifetime, with age groups 18 - 29 and 30 - 44 years old reporting the most symptoms. Lifetime incidence is estimated as follows: major depression – 4.9%-14.9%, major depressive episode – 6.3% - 17.1%, and dysthymia – 3.2% - 6.4% (Kaelber et al., 1995).

As early as 1978, Beck and Young approximated that one out of four college students would have depression in various forms during their college career (cited in Nagelberg et al, 1983). Currently, depression appears to be on the rise in college populations and younger people in general (D. A. Clark et al., 1999; Nagelberg, Pillsbury, & Balzer, 1983), although the notion of it being an epidemic in children has been debated (see Costello, Erkanli, & Angold, 2006). Many college students have depression of varying severity that goes undiagnosed, and depression rates are higher in college students than in non-students and are associated with suicide and dropout (Nagelberg et al., 1983). In Nagelberg et al.'s study, 23.7% of the total class attendees reported depression, with 7.5% of total sample falling into the moderate to severe range. In a more recent survey of college students by Rosenthal and Schreiner (2000), 12.6% of the total nonreferred college sample endorsed high level of depression, whereas 41.6%

endorsed at least a moderate level. Younger students reported higher levels of depression than those over 25 years old (Rosenthal & Schreiner). It has been argued that depression in students is a conceptually different entity than that in clinical populations (Coyne & Gotlib, 1983; cited in Endler et al., 1998). Its uniqueness may lie in that it does not include a vegetative component (e.g., lack of sleep, loss of sexual drive, and loss of appetite) and remits rapidly (Endler et al.). Most of the data on the prevalence of depression come from clinical studies, and there is still much to be done to shed the light on the manifestation of this disorder in college students (McDermott, Hawkins, Littlefield, & Murray, 1989).

2.3.3 Sex Differences in Depression

It is generally found that women evidence more depressive symptoms than men. Sex differences, with depression prevalence among women 1.5 times to 3 times more than men (average ratio 2:1 in developed countries), have been long established through literature reviews (Weissman & Klerman, 1977) and replicated in various studies both national and international (Culbertson, 1997; Gater et al., 1998; Kaelber et al., 1995; Kessler, McGonagle, Swartz, et al., 1993; Weismann, Bland, & Canino, 1996). Women are also more often diagnosed and treated for depression than men and have a higher lifetime risk for Major Depressive Disorder (*DSM-IV-TR, 2000*). Among children, boys are equally or even more likely to be diagnosed with depressive syndromes (Nolen-Hoeksema, 1987). Once puberty starts, significantly more girls than boys report depression, and the magnitude of differences wanes in old age (Jorm, 1987; Kessler et al., 1993; Mash & Barkley, 1996), although mid- to late adulthood may also see an increase in depression (Parker & Hadzi-Pavlovic, 2004).

Sex ratio holds for clinical as well as nonclinical populations (Nolen-Hoeksema, 1990; cited in Brems, 1995). Rosenthal and Schreiner (2000) indicated that although depression in college students has been well researched, sex differences did not receive consistent support in many studies. In their study, Rosenthal and Schreiner found that although the differences in self-reported depression symptoms between college women

and men were significant, the magnitude of differences was small. Yet recent research continues to lend support to the statement that college women endorse higher levels of depression on self-report measures than men (e.g., Carmody, 2005).

Literature yields several explanations that account for the existing differences. The hypotheses of differential treatment seeking, differential reporting, and flawed methodology have not been substantiated (Amenson & Lewinsohn, 1981; Nolen-Hoeksema, 1990; Weissman & Klerman, 1985; all cited in Brems, 1995). Biological models suggest that depression may be genetically-based or related to the female reproductive cycle, as in the case of premenstrual and postpartum syndromes and menopause (Burt & Stein, 2002). Currently, there is not enough evidence to support biological hypotheses unequivocally (Beckham, Leber, & Youll, 1995; Nolen-Hoeksema, 1987; Petersen et al., 1993). However, a similar relative preponderance of women over men across the globe found in both industrialized and less industrialized countries (see Gater et al., 1998) could potentially attest to the importance of biological factors in the etiology of depression. Psychosocial accounts of depression involve such depression correlates as socioeconomic factors (e.g., socioeconomic status, income, employment, and education), social roles and social support issues, discrimination, socialization and personality development, and interpersonal violence (e.g., sexual harassment, rape, spouse abuse, and history of childhood sexual abuse). There has been considerable empirical support for the notion that depression is related to women being socially disadvantaged (for a review of literature, see Brems, 1995). Although no one model appears to account for the magnitude of differences sufficiently, the depression sex ratio does not appear to stem from methodological or other types of confounding and is most likely to be a result of a complex interplay between biological and psychosocial factors (Gater et al., 1998; Kaelber et al., 1995).

2.3.4 Summary

Depressive affect is common; however, if severe, prolonged, and untreated, it can cause severe impairment in all areas of functioning and lead to suicide. Depression is

complex and encompasses physiological, affective, behavioral, and cognitive signs. In a clinical field, depressed mood is included in several disorders as a symptom. However, categorically-based diagnostic tools fail to account for other maladaptive conditions involving depressive states, and the best system of depression classification is still to be devised. Depression rates run high among adolescents and adults (including clinical and nonclinical samples) and are particularly high in college students. On average, depression is seen twice as often in women than men, with sex differences first appearing in adolescence and somewhat equivocal support for sex differences among college students.

2.4 Relationship Between Anxiety and Depression

2.4.1 Comorbidity of Anxiety and Depression

Although anxiety is not the only comorbid condition of depression, it is by far the most common and robust one (D. A. Clark et al., 1999; L. A. Clark, 1989). It is noteworthy that current first-line treatment for both depression and anxiety symptoms is antidepressants, indicating a possibility of a similar neurological basis. Further, certain anxiety disorders (e.g., GAD) share genetic susceptibility and linkage to depression (Kendler, 1996; Kendler et al., 1995, cited in Widiger & Clark, 2000). Correlations between anxiety and depression have been frequently found in diverse subject samples and with various types of assessment (Watson & Kendall, 1989). Comorbidity rates of anxiety and depression have reported to range from 15% to 75%, with children and adolescents showing the highest co-occurrence (L.A. Clark, 1989; Kessler et al., 1996; both cited in Mineka et al., 1998; Kovacs, 1990; cited in Petersen et al., 1993; Rhode, Lewinson, & Seeley, 1991; Young, Mufson, & Davies, 2006). Comorbid depression-anxiety expression in adults and adolescents is often associated with an earlier onset of depressive symptoms, more severity, more persistence, poorer post-treatment outcomes, greater impairment in social and occupational functioning, greater use of mental health services and medications, and a greater risk of suicide than “pure” symptomatic

expression (e.g., Fava et al., 2000; Joormann, Kosfelder, & Schulte, 2005; Lewinsohn et al., 1997; Mineka et al., 1998; Moffitt et al., 2007; Pine et al., 1998; Young et al., 2006).

In terms of a temporal relationship between anxiety and depression, several findings have emerged, pointing to either anxiety or co-occurring anxiety/depression condition preceding major depression and/or serving as a risk factor for future depression, but not vice versa (Alloy, Kelly, Mineka, & Clements, 1990; Kendler et al., 2002; Lewinsohn et al., 2000; Mineka et al., 1998; Pine et al., 2001; Parker et al., 1999; Rhode, Lewinson, & Seeley, 1991). It is argued that depression without anxiety is much more rare than anxiety without depression (Mineka et al., 1998). Overall, there appears to be much stronger evidence that "pure" anxiety tends to develop into a mixed depression-anxiety condition rather than "pure" depression turning into a mixed disorder (Fava et al., 2000). In a recent longitudinal study, Moffitt et al. (2007) found that pure GAD had risk factors similar to comorbid GAD and MDD participants, while pure MDD did not. In women, presence of an anxiety disorder is sometimes seen as contributing to the increased chance of an initial depressive episode (Breslau, Schultz, & Peterson, 1995, cited in Parker & Hadzi-Pavlovic, 2001). Further, sex differences can be an important factor when identifying anxiety disorders that precede, coincide with, and follow depression (Fava et al.; Parker & Hadzi-Pavlovic, 2004).

Findings of comorbidity among clinical disorders of anxiety and depression seem mostly consistent, although the estimates vary depending on whether it is an anxiety disorder with comorbid depression or depression with comorbid anxiety. L.A. Clark's (1989) meta-analysis of clinical studies indicated similar comorbidity rates for any anxiety disorder with depression (57%) and any depressive disorder with anxiety (56%). In their review of literature, Brown and Barlow (1992) estimated that 50% of those with principal anxiety disorder had at least one other clinical anxiety and depressive disorder. Kessler et al.'s (1996) review of the National Comorbidity Survey yielded 58% lifetime prevalence rates of anxiety with depression. In a study by Zimmerman, McDermut, &

Mattia (2000), more than one half of the patients with depression met the full *DSM-IV* criteria for an anxiety disorder.

When reviewers zero in on the comorbidity of depression with specific anxiety disorders, the rates differ greatly across disorders (e.g., Mineka et al., 1998) and across studies. For example, Brown and Barlow (1992) found that GAD and PD with agoraphobia had the highest comorbidity rates with depression, while specific phobia had the lowest. Similarly, in the National Comorbidity Survey (community research), most of lifetime depression cases were comorbid, with highest rates for GAD, followed by PD, PTSD, agoraphobia, simple phobia, and social phobia (Kessler, Nelson, McGonagle et al., 1996; cited in Hadzi-Pavlovic, 2001). In a more recent study with a clinical adult sample with MDD by Fava et al. (2000), comorbid anxiety disorder diagnoses were present in 50.6% of these participants, with social phobia being the most prevalent (27.0%) and agoraphobia being the least prevalent (5.5%). Based on epidemiological research, several studies reported that 27-75% of PD client receive an additional diagnosis of MDD (Breier, Charney, & Henninger, 1984; Dealy, Ishiki, Avery, Wilson, & Dunner, 1981; both cited in Joormann et al., 2005).

Frequently, the greatest rates of co-occurrence are seen between MDD and GAD (Brown, Chorpita, & Barlow, 1998; Kendler et al., 1995, cited in Widiger & Clark, 2000; Kessler et al, 1996, cited in Moffitt et al., 2007). Mineka et al. (1998) concluded that specific phobia demonstrates the lowest association with depression, although noted that the diversity of findings obfuscates any definitive inferences about which anxiety disorders manifest the highest comorbidity. Further, Levine et al. (2001) summarized the results from several epidemiological studies on lifetime comorbidity of anxiety and major depression: GAD (20-60%), PD (30-50%), OCD (30%), social phobia (30-35%), PTSD (30-40%), and anxiety symptoms (60%). The data converge on the conclusion that comorbidity of specific anxiety disorders with depression is typically lower than that with generalized anxiety (with the exception of social phobia). Indeed, clinically-defined depression and generalized anxiety disorder share many of the same symptoms, such as irritability, insomnia, crying, restlessness, and fatigue, whereas specific anxiety disorders

and conditions appear to share fewer diagnostic symptoms with depression and have seemingly disparate themes (Endler & Kocovski, 2001). Therefore, specific anxiety disorders could be more easily differentiated from depression than the condition of generalized anxiety (Epkins, 1996; Ingram et al., 1987; Sanz & Avia, 1994).

It must be added that the comorbidity between anxiety disorders and depression is complicated by a significant overlap among disorders within the anxiety group. For example, Brown et al. (1998) found that among anxiety disorders, one of the strongest correlations was between OCD and GAD. Taken together, the findings above indicate a close link between depression and anxiety (as well as within anxiety group) and have prompted theorists to try to explore the nature of their connection and differences.

2.4.2 Theoretical Explanations of the Anxiety-Depression Relationship

Relationship between depression and anxiety has been a topic of lengthy debates, as they have been viewed at different time as discrete (Akiskal, 1985; cited in Mineka et al., 1998; Roth et al., 1972, cited in Levine et al., 2001) or closely related conditions. Theoretically, anxiety and depression can be construed as two separate entities that frequently appear together or appear at different levels, as reflections of the same phenomenon, or as sharing a common factor (Levine et al.). Additionally, an anxiety-depression disorder can be conceptualized as distinct from either one of the two taken separately. Currently, given the diagnostic comorbidity, nonspecific drug response in both groups, and substantial correlations between the self-report measures, which are reported to run as high as .66 - .70 for referred and nonreferred populations (Dobson, 1985; D.A. Clark et al., 1990; L.A. Clark & Watson, 1991), it is well accepted that anxiety and depression have common components and should be examined together (Watson, 1999). A gap between theory and practice is evident, as most psychosocial treatment approaches to anxiety and depression are founded on an assumption that they represent two different conditions (van Lang, Ferdinand, Ormel, & Verhulst, 2006).

The modern search for conceptualization of the anxiety-depression relationship mirrors that of any co-occurring psychopathological states. Specifically, the study of the

depression-anxiety relationship is marked by a lack of terminological precision in the field (L. A. Clark & Watson, 1991). The several meanings of the two constructs vary from study to study and could be difficult to differentiate, compounded by lack of firm agreement on whether to treat them as continuous or categorical variables (see L.A. Clark, 1989, for detailed discussion). Also, theorists, researchers, and clinicians differ in terms of how they view differences and similarities between the two disorders.

Methodological factors commonly viewed as responsible for the high intercorrelation of the measures include poor discriminatory ability of the scales and a lack of symptom specificity/content overlap between the measures of anxiety and depression, which tend to assess general dysphoria (psychopathology) (Burns & Eidelson, 1998; L.A. Clark & Watson, 1991; Dobson, 1985; Endler et al., 1992; Endler, Denisoff, & Rutherford, 1998; Hollon & Kendall, 1980). Interrelatedness of the affective states and the correlation between the cognitive and affective variables pose a caveat for research, resulting in the issue of *affective confounding*. Ingram (1989b) emphasized that by examining a group of participants with one maladaptive condition, in reality, one would obtain a sample with multiple disturbances, which would obscure accurate interpretations of the study.

A categorical diagnostic approach of the *DSM-IV* treats depression and anxiety as mostly conceptually and empirically discrete phenomena (L.A. Clark & Watson, 1991). No temporal predictions of the relationship between anxiety and depression can be currently made using the *DSM* model, although it does not preclude that one may develop into another over time (L.A. Clark & Watson). A diagnosis of Mixed Anxiety-Depressive Disorder is mentioned in the appendix as an avenue for further research (*DSM-IV-TR,* 2000). This comorbid condition includes depressed mood and several other symptoms, e.g., concentration/memory difficulties, sleep disturbance, fatigue/low energy, irritability, worry, being easily moved to tears, hypervigilance, anticipating the worst, hopelessness/pessimism about future, and low self-esteem/feelings of worthlessness (*DSM-IV-TR*).

Those favoring continuity rely on current longitudinal and cross-sectional research that supports anxiety and depression being expressed at different points in time, i.e., either being points on a continuum or being alternate manifestations of a common vulnerability factor (L.A. Clark & Watson, 1991; Widiger & Clark, 2000). Many researchers (e.g., L.A. Clark & Watson) also gravitate towards a 'common factor' approach that is speculated to account for the research findings. According to this popular view, comorbidity between anxiety and depression, as well as among anxiety disorders, is proposed to be due to them being comprised of features that are present in varying degrees in all emotional disorders (Brown et al., 1998). This factor has been labeled differently by different theorists (e.g., 'general distress', 'neuroticism', 'negative affectivity') but appears to reflect a similar shared concept (Watson et al., 2005; cited in Moffitt et al, 2007; Krueger et al., 1998). Overall, there is insufficient evidence to abandon the categorical system and particularly clinical cutoffs altogether (Haslam, 2003; cited in Norton, 2006; Kessler, 2002), despite the fact that much research points in favor of the dimensional approach.

Many explanations of a temporal dimension of the anxiety-depression relationship have been offered. It has been proposed that an overlap between anxiety and depression occurs only at high severity levels (e.g., Akistal, 1990; cited in L.A. Clark & Watson, 1991) or that anxiety predominates at lower levels of distress, while depression may be dominant at higher levels of distress, corresponding to a temporal order of the persons responding to major life stressors (Alloy, Kelly, Mineka, & Clements, 1990; cited in Rohde et al., 1991; D.A. Clark & Steer, 1996). The accumulated evidence in favor of continuity approach is substantial (Fava et al., 2000)

Overall, when devising new models of affective psychopathology, theorists are urged to move towards more complex, multilevel hierarchical models that classify groups of symptoms based on varying levels of specificity, whereby some symptoms will be applicable to a wide range of disorders, while other symptoms will apply to a selected few (Widiger & Clark, 2000).

2.4.3 Summary

Anxiety and depression show intercorrelations between self-report measures, a significant overlap in their diagnoses, possible similar genetic origins. Additionally, anxiety often serves as a risk factor for future depression or comorbid anxiety-depression condition. There has been much debate about the nature of such co-occurrence, and literature suggests that the relationship between anxiety and depression would benefit from a more dimensional approach regardless of the fate of a categorical one. Currently, anxiety and depression are viewed by many as developmental entities that are likely to share a common factor of general distress. Comorbidity rates of depression with generalized anxiety disorder or anxiety symptoms are higher than those with other types of anxiety. Moreover, specific anxiety disorders do not manifest a significant symptomatic overlap with depression. Thus, they are hypothesized be more easily differentiated from it.

Cognitive theorists provided detailed accounts of ways to integrate common and specific factors in anxiety and depression, which generated a substantial body of research. Prior to addressing cognitive differentiation of anxiety and depression, which is a centerpiece of this dissertation, terminology and the basic tenets of the cognitive system and its role in psychopathology are examined. Special attention is paid to the automatic cognitions as a crucial element in content differentiation of anxiety and depression.

2.5 Cognitive View of Psychopathology

2.5.1 Cognitive System: Overview

In cognitive psychology, an information-processing approach has been one of the dominant paradigms. According to this view, most types of behavior could be viewed in relation to how an individual collects, assesses, transforms, encodes, recodes, and utilizes information (Ingram, 1984). Individuals actively seek and use both internal and environmental information, compare it to some internal representation, and then adjust

their behavior accordingly (Ingram). Cognitive theorists focus on the cognitive system as a major unit of personality. Although biological, interpersonal, and social factors and their interaction should always be considered if one wants to obtain a comprehensive picture of a maladaptive condition, from a cognitive perspective, the importance of cognitive components cannot be underestimated (Ingram & Malcarne, 1995).

The *cognitive system* is described as a reciprocal interaction between cognitive structures, cognitive processes, and cognitive products (D. A. Clark & Beck, 1989). These three primary components are involved in the representation and transformation of meaning, based on the sensory input from the environment (D. A. Clark et al., 1999). *Cognitive structures,* such as schemas*,* are a core concept within most cognitive models. *Schemas* are usually defined as relatively stable hypothetical "internal structures of stored generic or prototypical features of stimuli, ideas, or experience that are used to organize new information in a meaningful way, thereby determining how phenomena are perceived and conceptualized" (D. A. Clark et al, p. 79). Schemas usually vary in their content and structure. They are developed through repeated interactions with the environment, experience, and according to the already existing cognitive structures. *Schematic content* is comprised of beliefs, attitudes, assumptions, and judgments, which are sometimes referred to as *cognitive propositions* (Kendall & Ingram, 1987; Swallow & Segal, 1995). Repeated access of the schema strengthens it and makes the probability of its activation higher than that of the less developed schema.

Cognitive processes (or *cognitive operations*) are the paths through which elements of the cognitive system interact with each other (D.A. Clark et al., 1999; Ingram & Kendall, 1987). They are procedures that facilitate the feedback loop between cognitive structures and awareness (Kendall & Ingram, 1987). *Cognitive products*, such as automatic thoughts, perspectives, and appraisals are the output of the cognitive system (D. A. Clark et al.). Cognitive products are proposed to reflect both state and dispositional (trait) tendencies of the individuals (D. A. Clark et al.). Like cognitive

structures, cognitive products are comprised of informational content (Hollon & Kriss, 1984).

The cognitive system and its components are important to study because when malfunctioning, it has been implicated in the development of psychopathology. A faulty cognitive mechanism is rigid and prevents an individual from adequately adapting to the environment. It can subsequently lead to various maladaptive physiological, behavioral, affective, and motivational symptoms (D. A. Clark & Beck, 1989). Regardless of whether cognitive variables play a causal role in the onset of the psychological disorders, the efficacy of cognitive therapy in their treatment is substantial (Abramson, Alloy, & Metalsky, 1988). A theoretical account of the role of the cognitive system in psychopathology is presented below.

2.5.2 Cognitive System in Psychopathology

Among several cognitive models of psychopathology, Aaron Beck's schema model (A.T. Beck, 1976; D. A. Clark & Beck, 1989) holds a prominent place. Beck notes that although one's schemas are generally adaptive, when an individual develops maladaptive schemas, they result in the malfunctioning information processing and distorted cognitive products, which, in turn, reinforce a dysfunctional schema. Maladaptive schemas may be dormant or latent for prolonged periods of time but can be activated in stressful situations and can replace more adaptive schemas that guide individual's functioning most of the time (A.T. Beck). Activation of maladaptive schemas is thought to be the basis for the cognitive dysfunction (D. A. Clark et al., 1999), although more recent studies have lead researchers to speculate that those without psychopathology can also have biases in schematic processing (Segal, 1988). According to Beck's theory, once the schema is activated, the attention gets locked up on the specific content, and then it stays activated until the activating circumstances are no longer present. There is a rivaling explanation that frequent activation of schemas result in a state of "chronic construct accessibility" (Higgins, Klein, & Strauman, 1985, cited in Dykman & Abramson, 1990). However, all individuals possess the capacity to shift their

mental processes to constructive cognitive structures and, thus, transition from dysfunctional mental sets to adaptive ones (D. A. Clark et al.).

A maladaptive schema can cause a bias in information processing and selection in favor of the schema-relevant stimuli, when "people selectively perceive, remember, and interpret experiences so as to filter out information that disconfirms their cognitive [structures]" (D. A. Clark & Beck, 1989; Zeidner, 1988, p. 187). Such bias results in the cognitive products that are strongly associated with the dominant schema. The presence of a bias ensures that information that is consistent with the bias is processed quickly and effortlessly, through the allocation of most of the individual's resources towards the biased information (D. A. Clark & Beck). Thus, some individuals may experience intrusive and mostly unproductive thoughts that have been labeled differently in various disorders and fields of study, although they essentially capture the same process. The terms used include 'rumination' (typically used in depression literature), 'worry', 'obsession' (both from anxiety literature), 'mind-wandering', and 'daydreaming' (Klinger, 1996; Nolen-Hoeksema, 1991). Those maladaptive cognitive processes involve uncontrollable, repetitive, difficult-to-dismiss cognitive activities that focus a person's attention on an instrumental theme (Borkovec, Shadick, & Hopkins, 1991; cited in Segerstrom et al., 2003; Chang, 2003; Nolen-Hoeksema; Segerstrom et al.). Maladjusted individuals may also experience distractive responses, which presumably take an individual's mind off psychopathology and refocus it on pleasant or neutral activities (Chang; Nolen-Hoeksema). When looking at how an individual performs on a cognitive task, a process conceptually related to rumination and distraction has been termed *cognitive interference*, which can be defined as occurrence of unwanted thoughts due to cognitive processing that it is not under the individual's control, i.e., a bias in attention, judgment, and memory (Gotlib et al., 1996; Segal, 1996).

Another cognitive process involved in faulty cognitive processes is cognitive errors. A. T. Beck proposed that there are specific types of *cognitive errors*, which are systematic flaws or biases in the individual's information processing that result from

information being filtered through a maladaptive schema (A.T. Beck, 1976; Sacco & Beck, 1995) and are found to be associated with various psychopathological conditions (e.g., Smith, Aberger, Follick, & Ahern, 1986). Catastrophization, arbitrary inference, personalization, selective abstraction, and dichotomous thinking are all examples of cognitive errors.

As prevalent and co-occurring psychopathological conditions with distinct cognitive elements, anxiety and depression have been the focus of attention in cognitive research. Before the models attempting to differentiate between the two based on cognitive content could be presented, cognitive systems in anxiety and depression are summarized.

2.6 Cognitive System Differentiation of Anxiety and Depression

Cognitive theorists have long disagreed on how they view the nature of the cognitive-affective relationship of affective and mood disorders. For example, Ellis (1977) advocated a generality hypothesis, postulating that a few core beliefs can lead to irrational automatic cognitions, which can mediate any of several emotional states. However, most current researchers favor specificity approach, while attempting to account for the common factors of the anxiety and depression (e.g., L.A. Clark & Watson, 1991; Ingram & Kendall, 1987).

Prior to reviewing specificity in a cognitive domain, several issues need clarification. Firstly, generally speaking, specificity in psychopathology can be viewed as the ability of a measure or a construct to reliably set apart those with a particular condition or disorder. Thus, one has to address both within- and between-condition specificity, as well as differentiation of pathology from the adaptive functioning. Second, R. Beck and Perkins (2001) cautioned that there is some confusion in the literature regarding the term ‘cognitive content specificity’. They suggested making a distinction between ‘cognitive specificity’ and ‘cognitive content specificity’, based on the

taxonomy offered by Kendall and Ingram (1989). Thus, hereby 'cognitive specificity' term is used to broadly describe any cognitive variable specific to either depression or anxiety (e.g., memory, cognitive biases, cognitive products), whereas 'cognitive content specificity' refers to a more specifically circumscribed content (reflective of themes in automatic cognitions).

2.6.1 Cognitive System in Anxiety

In their review of literature, Freeman and DiTomasso (1994) summarized the basic assumptions of the cognitive model of anxiety about the role of the cognitive system as follows: (1) "the cognitive system plays a vital and essential role in appraising danger and resources and activating the physiological, motivation, affective, and behavior systems…" (p. 78); (2) it "mediates its influence through repetitive unpremeditated and rapid involuntary thoughts and/or images of which the individual is unaware…" (p. 78), which are often referred to as 'worry'; (3) "in trigger situations, anxiety disordered individuals have a tendency to activate danger/threat schemas by which they selectively screen in stimuli that indicate danger and screen out those stimuli that are incompatible with danger" (p. 78); (4) those individuals have "impaired objectivity and ability to evaluate their threat bound cognitions in a realistic manner" (p. 78); and (5) they "exhibit systematic errors in processing information by, for example, catastrophizing, selectively abstracting, thinking dichotomously, and making arbitrary inferences" (p. 78). Moreover, cognitive factors, such as abnormalities in information processing and beliefs, can serve as important predisposing and precipitating factors in the development of anxiety disorders (A.T. Beck et al., 1985; Freeman & DiTomasso). Specifically, certain beliefs (e.g., a belief that anxiety symptoms have harmful consequences) may predispose individuals to specific anxiety disorders, whereas other beliefs (e.g., that uncertainty is unacceptable) may be crucial for their maintenance (Starcevic & Berle, 2006). Thus, cognitive theorists agree that individuals with anxiety exhibit systematic biases in cognitive processing due to interpreting of anxiety symptoms as catastrophic or threatening (Armstrong & Khawaja, 2002). Misinterpretation, although varying in

content (e.g., regarding bodily symptoms, intrusive thoughts, aspects of the traumatic event, consequences of the traumatic event), is thought to be a common feature of several anxiety disorders.

2.6.1.1 Differentiating Among Various Anxiety Conditions

Due to heterogeneity of anxiety, cognitive models frequently assert that parts of cognitive system are specific to particular anxiety disorders. Researchers have long been intrigued by cognitive differentiation among different types of anxiety. Based on their review of research on cognitive specificity, Kendall and Ingram (1989) concluded that general and specific anxiety disorders are indeed associated with different cognitive patterns. These differences may result from a situational activation of anxious states by different threatening stimuli and a variation in cognitions within the anxiety disorder group (D. A. Clark & Beck, 1989; Kendall & Ingram). For example, it has been proposed that specific anxiety conditions can be differentiated based on themes corresponding to their trait fear content components, i.e., social evaluation, physical danger, daily routines, separation, etc. (Endler & Kocovski, 2001). Thus, each of the many facets of trait anxiety can be viewed as corresponding to major anxiety disorders (Sanz & Avia, 1994). However, differences in profile can also be due to the interaction of depression and anxiety that produces an effect that is different from either one of disorders taken separately (Kendall & Ingram). In addition to the differences in schematic content, each anxiety disorder presumably has interference-based clinical symptoms, with the specific content varying from one disorder to the other (Segal, 1996).

Over the last two decades, cognitive models of anxiety outlining specific components of the disorder have been developed for various clinical disorders, e.g., PD, GAD, social phobia, OCD, and PTSD. While it is widely accepted that anxiety disorders share at least a few cognitive symptoms, such as negative thought content (Chambles & Hope, 1996, cited in Breitholtz et al., 1999), certain beliefs have come to be associated with specific disorders (e.g., a belief that one's thoughts affect the occurrence of external events is linked with OCD) (Starcevic & Berle, 2006). In addition to beliefs, other

cognitive mechanisms and constructs (most of them not explicitly defined by Beck's cognitive theory) have been implicated in the etiology and maintenance of specific anxiety disorders. For example, social anxiety disorder has been associated with fear of negative evaluation and an increase in self-focused attention; PD with fear of fear and anxiety sensitivity; GAD with pathological worry, positive or negative beliefs about worry, and intolerance of uncertainty; OCD with thought suppression, doubts regarding one's memory, attaching importance and need to be responsible for one's intrusive thoughts; and PTSD with negative appraisals of the trauma, expectations of unpredictable danger following the trauma, and poorly integrated memory of trauma (Starcevic & Berle). In a study by Ball, Otto, and Pollock (1995), social phobia and PD differed in their fear of negative evaluation and assertiveness, although did not differ in anxiety sensitivity and catastrophic beliefs about panic attacks.

Within-class specificity of anxiety disorders may not be absolute (e.g., Ball et al., 1995; Starcevic & Berle, 2006), suggesting a possibility of an underlying common cognitive component or an additional moderating variable. Cognitive-affective models of anxiety, in which there is a common general distress factor and lower-level differentiating factors (e.g., Brown, 2002; Brown et al., 1998; D.M. Clark & Wells, 1995; Goldberg, 1996; Norton & Hope, 2005; Zinbarg & Barlow, 1996) strive to explain common and unique features within the group of anxiety disorders. Thus far affective factors have been more successful at differentiating some anxiety disorders than others.

2.6.2 Cognitive System in Depression

Many cognitive theorists have attempted to describe the depressive symptoms and patterns and to elucidate depression mechanisms. Aaron Beck's cognitive theory of depression (1967, 1976) gave rise to a substantial body of research. Beck proposed that a cognitive system of depressive individuals is composed of three major tenets, i.e., schema, negative cognitive triad, and cognitive errors. Depressogenic schemas may be related to real or perceived loss and have state-dependent quality (A.T. Beck, 1976).

Activation of those schemas will result in a cluster of affective, behavioral, somatic, and motivational symptoms (A.T. Beck; Sacco & Beck, 1995).

Negative cognitive triad is postulated to be the content of the depressogenic schema and relates to the notion that depressed individuals hold a dysfunctional view of themselves, the future, and the world. Dominant cognitive structures of individuals with depression are characterized by pessimistic and self-deprecating content that helps perpetuate depressive affect (Ingram & Malcarne, 1995). Depressed individuals see themselves as unloved, unworthy, and incapable of attaining happiness, due to a lack of the attributes necessary for this task. They view everyday experiences in a negative manner and misinterpret their interactions with environment as signs of their defeat and deprivation. Demands placed on them by the world are seen as unreasonable and outrageous, and the world is perceived as producing hindrances that impair their ability to reach goals (A.T. Beck, 1976; A.T. Beck et al., 1979). Their future expectations are usually characterized by themes of anticipated failure, rejection, and dissatisfaction. Depressed individuals believe that their hardships would continue indefinitely (A.T. Beck). Empirical evidence is supportive of the cognitive triad (Asarnow & Bates, 1988; A.T. Beck, Riskind, Brown, & Steer, 1987; A.T. Beck, Steer, Epstein, & Brown, 1987; Blackburn, Jones, & Lewin, 1986; Brown & Beck, 1989; D.A. Clark, Beck, & Brown, 1989; Greenberg & Beck, 1989; Space & Cromwell, 1980).

In addition to the cognitive triad schematic content, A.T. Beck et al. (1983, 1987) proposed a distinction between two trait types of schematic content, i.e., autonomous (high achievement concerns) and sociotropic (high interpersonal concerns), which serve as vulnerability factors for depression when achievement or interpersonal stressors, respectively, are experienced. There is still much work to be done to establish a unique link between depression and Beck's cognitive constructs (for review of literature, see Nietzel & Harris, 1990). Specificity studies in this area (e.g., Alford & Garrety, 1995; 2003) have not yielded support for sociotropy and autonomy as vulnerability markers, although preliminary evidence appears to support sociotropy more than autonomy (e.g., Burke & Haslam, 2001; Sato & McCann, 2000; both cited in Keller & Nesse, 2006).

Further, compared to nondepressed individuals, those with depression have been found to demonstrate more negative schematic content, higher accessibility, stability and interconnectedness of self-elements within the schemas, and more availability of the stored content (Dozois, 2007; Dozois & Frewen, 2006; Ingram, 1984; Segal, 1988).

Besides differences in schematic content, individuals with depression are hypothesized to have processing biases, such as major cognitive errors (e.g., overgeneralization, selective abstraction, catastrophization, and personalization), selective processing, rumination, and cognitive interference (A.T. Beck et al. 1979; Ellis & Ashbrook, 1987; cited in Dombeck et al., 1996; Gotlib et al., 1996). Current empirical evidence speaks for the presence of cognitive biases in depressive processing (Ellis, Moore, Varner, Ottaway, & Becker, 1997; M.F. Lefebvre, 1981; Pierce et al., 1998). Consistent with Beck's theory, those with depression attend to information that is loss/failure related and ignore the positive features of the situation. Depressed individuals also tend to ruminate, i.e., they frequently revisit personal disappointments and mistakes, question the quality of life, focus on feelings of despondency and isolation, and dwell on personal inadequacies (Davis & Nolen-Hoeksema, 2000). They also ruminate about depressive symptoms, causes, consequences, and meaning. Such process leads to more extended episodes of depression (Segerstrom et al., 2003) because it augments existing maladaptive thinking, interferes with attentional resources, and contributes to a biased recall of information (Chang, 2003).

Thus, both anxiety and depression appear to have biased cognitive systems, with similar constructs involved in dysfunctional processing. This makes reliable cognitive differentiation a worthy cause. Before the models of content specificity in depression and anxiety are introduced, the concept of automatic thoughts, including their role in psychopathology in general and in anxiety and depression conditions in particular, is expounded on.

2.7 Cognitive Content Specificity of Anxiety and Depression: Automatic Thought Differentiation

2.7.1 Automatic Thoughts

Automatic thoughts are one example of cognitive products. They are transient, involuntary, and situation-dependent streams of consciousness in verbal or visual form (A.T. Beck et al., 1987; D. A. Clark & Beck, 1989). Automatic thoughts are often viewed as part of *internal dialogue*, or *self-talk*. Burnett (1996) noted that there is confusion in the literature as to conceptualization and terminology related to the self-talk phenomenon. A few largely synonymous terms used in the literature include 'self-statements', 'inner speech', 'inner dialogue', 'private speech', 'private self-talk', 'internal dialogue', 'self-referent verbal statements', 'speech-to-self', 'verbal self-regulation', 'self-directed speech', and 'self-cognition' (Burnett). Furthermore, some researchers (Kleijn, van der Ploeg, & Topman, 1994; Spielberger & Vagg, 1987; Topman, Kleijn, van der Ploeg, & Masset, 1992) distinguish between 'cognitions' (resulting from cognitive structures and beliefs) and 'task-related thoughts'(which are part of the internal dialogue and self-referent speech).

In this manuscript, the terms *cognitions* and *automatic thoughts* are used interchangeably, as it is believed that most automatic thoughts, however task-related, are likely to be a product of interplay of cognitive structures and environment. It is implicit that some portion of self-talk is instructional in nature (Conroy & Metzler, 2004). Instructional self-statements are "aimed at directing thought or behavior positively and at influencing task control and completion" and are related to stress coping and psychological adjustment (Calvete & Cardeñoso, 2002, p. 477). Examples of such cognitions include: "I don't have to get upset", "Just relax and let the words come," and "Just say what you have to say" (Kendall & Chansky, 1991; cited in Calvete & Cardenoso). Instructional talk was not of immediate interest to the current study.

Researchers struggle to adequately capture the introspective information. Being easily accessible to awareness, automatic thoughts lend themselves to convenient

measurement and have been at the center of various instruments in the clinical and psychoeducational fields of study (e.g., internalizing disorders, psychotic disorders, social evaluative anxieties, and stress and coping). Examples of various aspects of automatic cognitions include valence (positive, negative, or neutral), frequency, content, sequence, orientation or mode (present, past, or future), intensity, believability, ease of removal or controllability, intrusiveness, importance, impact on functioning, individual reactivity, unacceptability, and personal responsibility for the outcome (D.A Clark, 1986; Di Nardo & Barlow, 1990; Glass & Arnkoff, 1997; Heimberg et al., 1987; Ingram & Kendall, 1987; Kroll-Mensing, 1992; cited in Klinger, 1996). Methods of assessment include recognition, recall (with or without prompt), projective, expressive, and naturalistic. Examples of assessment techniques are statements (including self-statements), questions (typically, as part of structured questionnaires), thought-listing, think-aloud procedures, and videotape-aided thought reconstruction. The nature of the thought-evoking stimuli can differ, e.g., real-life, role-played, videotaped, or imagined. Real-life scenarios are expected to evoke more valid responses than imagined situations (Kendall & Hollon, 1981). Self-statement measures are typically completed after a particular task. The subjects are asked to indicate how frequently each thought occurred to them while they were working on the task. In thought-listing procedure, subjects list their thoughts in response to stimuli and the thoughts are later coded. Ratings of self-statements are hypothesized to lead to judgments of a general nature, which may be reflective of the existing cognitive structures (Bruch, 1996) and are, therefore, frequently used in cognitive research.

2.7.2 Automatic Thoughts in Psychopathology

Early cognitive theorists (Butler, 1983; Ellis, 1962; Meichenbaum, 1977, cited in Bruch, 1996) proposed the link between inner speech and how people feel and behave. Most cognitions are adaptive in nature, and it is the intrusion of maladaptive cognitions

into consciousness that is deemed by some the immediate cause of psychopathology (Kendall & Hollon, 1981). Dysfunctional automatic thoughts are emotionally distressing and reflect biased representation of reality, including the self, by the cognitive system (J.S. Beck, 1995; D.A. Clark et al., 1999). Hollon and Garber (1980) posit that changing cognitive products (or surface cognitions) is paramount for the treatment of the disorder (i.e., immediate stress alleviation).

Valence, form, content, and sequence of cognitions (although the latter not sufficiently explored in the literature) have all been hypothesized to be of significance in psychopathology. For example, Meichenbaum (1977) suggested that, in contrast to maladjusted individuals who dwell on the negative thoughts, well-adjusted people may initially generate negative thoughts, subsequently counteracting them with positive ones (cited in Bruch, 1996). Considered crucial for the maintenance of the processing bias, the valence of automatic thoughts has been included as a dimension of many cognitive measures. Both positive and negative cognitions play an important role in the mediation of cognition and affect (Ingram & Wisnicki, 1988; Kendall & Ingram, 1987). Positive and negative dimensions of self-talk and evaluation are believed to be bivariate (Cacioppo & Gardner, 1997) but are not necessarily independent (Calvete & Cardeñoso, 2002). Neutral self-talk has not been tied to dysfunction as a distinct variable (Bruch, Heimberg, & Hope, 1991; Heimberg, Bruch, Hope, & Dombeck, 1990), although it has been inferred that neutral thoughts along with negative ones interfere with cognitive tasks in the form of distracting cognitions (Nolen-Hoeksema, 1991; Sarason et al., 1986).

There are several important hypotheses on how the valence of automatic thoughts can be implicated in maladaptive conditions. One approach focusing on the role of positive thoughts suggests that increased positive thinking is associated with better psychological adjustment (Taylor & Brown, 1988, cited in Joiner, Kistner, Stellrecht, & Merrill, 2006). Taylor and Brown have contended that in contrast to the disordered individuals, mentally healthy people show unwarranted optimism and unrealistically positive self-evaluations, or “illusory glow” (cited in Joiner et al.). An opposing camp of

researchers has focused on distortions characterizing psychopathology, which has been hypothesized to be linked with reduction in positive thoughts and increase in negative thoughts (Allport, 1937; Asendorpf & Ostendorf, 1998; A.T. Beck et al., 1979; Block & Thomas, 1955; Colvin et al., 1995; all cited in Joiner et al., 2006). An idea that low negative thinking can help differentiate adjusted individuals from those with emotional maladjustment has been termed "the power of non-negative thinking" by Kendall (1984) and has gained substantial research support (for reviews, see Arnkoff & Glass, 1989; Kendall & Hollon, 1981). Similarly, low positive thinking can assist in setting those with psychopathology apart from those without it (e.g., Ingram, 1989a; Ingram, Slater et al., 1990; Ingram & Wisnicki, 1988).

Joiner et al. (2006) further proposed that a relationship between mental distress and the valence of self-ratings could be curvilinear, whereby both very negative and very positive biases would be associated with psychopathology (although with a stipulation that a negative bias in self-cognition may be associated with more psychopathology than a positive one). A study by Calvete and Connor-Smith (2005) showed that high levels of positive thinking could be associated with higher intrusive, i.e., socially annoying behaviors, such as bragging, teasing, showing off, talking too much, and demanding attention.

Another angle of valence interpretation in cognitions includes quantifiable ratios. The concept of ratios has long beguiled researchers. Ratios have been used to measure the percentage of positive, negative, and neutral cognitive constructs, including but not limited to automatic thoughts (Bruch, Heimberg, & Hope, 1991; Heimberg, Bruch, Hope, & Dombeck, 1990; Henriques & Leitenberg, 2002; Kendall & Hollon, 1981; Kendall, Howard, & Hays, 1991). Arguably, the most popular ratio taxonomy has been the one proposed by the States of Mind model and later by the Balanced States of Mind model.

2.7.2.1 States of Mind and Balanced States of Mind Models

The original States of Mind model (SOM; Schwarz & Garamoni, 1984; 1986, 1989) was empirically-driven and established a proportion of positive thoughts in self-

dialogue of positive and negative thoughts as an indicator differentiating pathology from adaptive functioning. The SOM ratios are calculated as the sum of positive cognitions divided by the sum of both negative and positive cognitions. The ratio of .618 was postulated to reflect an optimal proportion of positivity and necessary attention to negative events (Schwarz & Garamoni, 1989). Based on the empirical evidence, neutral cognitions were not included in the model (Schwartz & Michelson, 1987; cited in Schwartz, 1992). The authors of the model had suggested a total of five states of mind, characterized by different empirically-based SOM set values and ranges. However, the model has been challenged in terms of appropriateness of its optimal ratios, as some studies found it to be higher than .62 (Fichten, Amsel, Robillard, & Tagalakis, 1991; Haaga, Davison, McDermut, & Hillis, 1993; both cited in Heinrichs & Hofmann, 2005; Topman et al., 1992).

Recently, the original SOM model has been reformulated. The new approach, which was termed 'Balanced States of Mind' (BSOM) model (Schwartz, 1997), draws on the work of a mathematical psychologist Vladimir Lefebvre (1985, 1990). In his reflexive theory of consciousness, Lefebvre proposed that humans have an "inner computer" that "allows them to regulate the ratio of positive and negative thoughts and feelings in a variety of human contexts" (Schwartz et al., 2002, p. 440). Lefebvre's theory establishes a link between the varying degrees of adjustment and cognition in that it yields a prediction that depending on the mood state, the individual's likelihood of positive self-evaluation (cognitive and affective) will fall within the specific ratios from 0.0 to 1.0. It is a *balance* view, where the individual's cognitive-affective system is a homeostatic mechanism governed by precise mathematically-derived logic. The concept of 'balance' is not new. Since the early days of ancient Egypt, China, and Greece, people have been trying to put a math ratio behind beauty, health, and mind. It has been given many names, including "golden ratio", "golden section", and "divine proportion". Prior to the BSOM model, the notion of balance was widely used in psychology, particularly in the area of stress and coping styles.

The BSOM model has yielded new intervals and set points, which were based on the ratios, calculated the same way as in the original model and associated with not just pathology and normality but also with optimal states of functioning. With its mathematically-derived values, the BSOM model represents a considerable improvement over its predecessor. Two new theoretically-sound categories were added (making a total of seven) and set points were revised, resulting in finer differentiation between categories. Also, in contrast to the previous SOM model, the BSOM approach now provides for the incorporation of the thought content and situational demands. Table 1 features the BSOM interval categories and their associated quantitative and qualitative features (Friedman, 2001; Schwartz, 1997). Very low, low, or very high ratios are associated with more maladaptive functioning, whereas moderately high ratios are linked to normal functioning.

Table 1

The BSOM Parameters and Associated Qualitative Labels

Interval Name	Range	Qualitative Description
NM	.00 - .09	Complete despair and profound psychopathology (i.e., profound depression or anxiety, self-loathing, withdrawal, and panic)
ND	.10 - .33	Severe psychopathology and chronic negative rumination (i.e., hopelessness, severe depression or anxiety, low self-esteem, and agitation)
Low	.10 - .15	
Mod	.16 - .22	
High	.23 - .33	
FCD	.34 - .41	Moderate psychopathology and impaired self-esteem (i.e., pessimism, worry, guilt, moderate depression or anxiety)
CD	.42 - .58	Presence of mild psychopathology (i.e., doubt, indecision, ambivalence, mild depression or anxiety)
SCD	.59 - .66	Successful management of negative events (i.e., positivity, realism in the face of stress and/or negative situations)
		Well-balanced evaluations:
PD	.67 - .90	Positive self-evaluations in neutral mood
N	.67 - .77	Positive self-evaluations in positive mood
O	.78 - .84	Positive self-evaluations in deep positive mood
SO	.85 - .90	Excess positivity, may be adaptive short-term (i.e., unrealistic
PM	.91 - 1.00	optimism, denial, and radical optimism, or mania).

Note. NM – Negative Monologue; ND – Negative Dialogue, Mod – Moderate; CD – Conflicted Dialogue; SCD – Successful Coping Dialogue; FCD – Failed Coping Dialogue; PD – Positive Dialogue: SO - Superoptimal, O - Optimal, N - Normal; and PM – Positive Monologue.

2.7.2.2 Empirical Support for the SOM and BSOM Models

The original States of Mind model received empirical support for being able to differentiate between functional and dysfunctional groups (Glass & Furlong, 1990; Heimberg et al., 1990; Michelson, Schwartz, & Marchione, 1992; Myszka et al., 1986; Nasby & Russell, 1997; Topman et al., 1992). Research has also yielded support for the model as a useful tool for measuring therapy outcomes, i.e., as patients undergo treatment, their SOM ratios shift in a positive direction (Bruch et al., 1991; Haaga et al., 1993; Heimberg, 1994; Garamoni, Reynolds, Thase, Frank, & Fasiczka, 1992; Myers, Lynch, & Bakal, 1989; Schwartz, 1993; Schwartz & Michelson, 1987). There is inconsistent evidence that the SOM ratios are superior predictors or are more informative of emotional responses, compared to negative thoughts alone (Beazley, Glass, Chambless, et al., 2001; Bruch, 1997; Bruch et al., 1991). However, they do appear to be better predictors of psychopathology than positive thoughts (Calvete & Connor-Smith, 2005; Calvete et al., 2005; Ronan & Kendall, 1997). Schwartz and Garamoni (1986, 1989) postulated that the ratios should remain stable regardless of the assessment method used; however, several studies (Burgess & Haaga, 1994; Heimberg, Bruch, Hope, & Dombeck, 1990; Myszka et al., 1986) found it not to be the case. At this point, it appears that self-statements yield more adaptive ratios and account for more variance in criteria measures than alternative automatic thought assessment methods, such as thought listing (Bruch, Hope, & Dombeck, 1990; Heimberg et al., 1990; Sturmer, Bruch, Haase, & Amico, 2002, Myszka et al., 1986).

Unfortunately, the predictions of the new BSOM model have not been extensively tested empirically (for exceptions, see Calvete et al., 2005; Calvete & Connor-Smith,

2005; Friedman, Schwartz, & Haaga, 2002). Also, the SOM/BSOM research has generated ambiguous findings regarding the potentially debilitating nature of a relative excess of positive cognitions. Contradicting the theoretical predictions of the BSOM model, Friedman et al. (2002) using affective ratios found that relatively high levels of positivity (i.e., high BSOMs) are not dysfunctional (also, see Amsel & Fichten, 1998; Haaga, Davison, McDermut et al., 1993; McDermut & Haaga, 1994).

Next, an overview of theory and research in content and valence for both anxiety and depression is presented.

2.7.3 Automatic Thoughts in Anxiety

2.7.3.1 Content

In anxious individuals, automatic thoughts result from activation of the future-related *threat* schema, and their cognitions revolve around themes of danger, vigilance, fear, and rejection (D. A. Clark et al, 1999; Ingram & Malcarne, 1995). According to A.T. Beck et al. (1985), the source of the threat within the "personal danger" schema varies across anxiety disorders, resulting in different content of cognitions. Thus, it is possible to differentiate between cognitive themes typical of some anxiety disorders. PD and GAD in particular have generated a substantial body of research supporting their specific cognition content (Breitholtz, Westling, & Öst, 1998; Hibbert, 1984; Rapee, 1985; Westling & Öst, 1993). Specifically, individuals with PD were found to show more thoughts related to physical catastrophes (e.g., illness, death, injury, losing control, and having a heart attack) and physical sensations. In contrast, patients with GAD reported more thoughts about mental catastrophes (e.g., inability to cope or to control, social embarrassment or threat), which included self-centered cognitions (competence or failure), interpersonal themes (e.g., acceptance or rejection, conflict, concern about life and health of others), and worry over minor matters. Cognitions of social phobia are typically dominated by a theme of negative evaluation. Various other facets found within negative anxious content reflect its heterogeneity and include hostility, meaninglessness,

hopelessness or existential matters, and worry or rumination about own mental processes and future negative events) (R. Beck et al. , 2003; Breitholtz et al., 1999; Schniering & Rapee, 2004). It must be noted that the aforementioned differences within anxious cognitions within across disorders have been mostly investigated with negative content. Positive content's themes remain to be explored.

2.7.3.2 Valence

Along with content, the valence of cognitions is also seen as an important factor in anxiety-relevant thoughts. Consistent with their schema, those with anxiety manifest more negative thoughts that are associated with dysfunctional cognitive processes, such as worry and obsessions, than those without anxiety (Borkovec & Inz, 1990, cited in Molina et al., 1998; Kendall & Hollon, 1989; Kocovski et al., 2005; Stopa & Clark, 1993; Tanner et al., 2006) and less positive thoughts (Glass, Merluzzi, Biever, & Larsen, 1982; Gressner, 2006). The pattern of increased negativity is typically observed across various clinical anxiety conditions, such as generalized anxiety, panic disorder, and social phobia.

Anxiety and the SOM and BSOM Models.

The SOM model has been empirically validated with anxiety in that the SOM ratios distinguished between those with and without pathology and/or supported treatment improvement in the following disorders: agoraphobia (Michelson, Schwartz, & Marchione, 1992; Schwartz & Michelson, 1987), social phobia (Bruch et al., 1991; Glass & Furlong, 1990; Heimberg et al., 1990), test/evaluation anxiety (Arnkoff, Glass, & Robinson, 1992; Topman et al., 1992), and PTSD (Nasby & Russell, 1997). No inferences can be made from the model as to whether it can differentiate between several anxiety disorders.

2.7.4 Automatic Thoughts in Depression

2.7.4.1 Content

Cognition content of the typically-studied unipolar depression has not yielded the same multitude of facets as that of anxiety disorders. In general, automatic thoughts of depressed individuals are believed to be products of the past-related cognitive schema of

loss and are focused on past personal failures, deprivation, and harm (A.T. Beck, 1976; Watson & Kendall, 1989). Despite relative uniformity, depressive cognitions have been found to have several intracontent elements, such as negative self-concept (including negative self-evaluation, self-blame, and failure), dissatisfaction (a negative view of circumstances and a desire for one's life to be different), and inability to cope (difficulty starting/completing actions and helplessness) (Calvete & Connor-Smith, 2005). Similar to anxiety, it is the negative portion of depressive thinking that was tested for the within-content heterogeneity, while positive intracontent elements have not been widely explored.

2.7.4.2 Valence

Arguably, the valence of automatic thoughts has been more frequently implicated in conceptualizations of depression than in those of anxiety. In Beck's cognitive model, two hypotheses address valence of the depressive content directly. The *negativity hypothesis* states that all types of depression are "characterized by the presence of absolute and pervasive negative self-referent thinking about the self, world, and the future" (D. A. Clark et al., 1999, p. 115) and that such thinking can be present only during depressive mood states (A.T. Beck, 1976; D. A. Clark & Steer, 1996). Thus, the automatic cognitions of the individuals with depression are expected to be overwhelmingly negative and reflect their overall pessimistic tendencies, low self-esteem, hopelessness, and self-deprecation (D.A. Clark et al.). The *exclusivity hypothesis* reads that "depression is characterized by the exclusion of positive self-referent thinking" (D. A. Clark et al., p. 115). It implies that, in addition to heightened negativity, depression is accompanied by a relative, not absolute, reduction in positive thoughts. The exclusivity hypothesis indicates that the decline in positive cognition is a distinct phenomenon and is as essential for depression as the increased negativity (D.A. Clark et al.).

In their review of the empirical support for Beck's negativity and exclusivity hypotheses, D.A. Clark and Steer (1996) note that evidence for the negativity hypothesis

appears to be considerable, even with varying methodologies. Negative cognitions have been found to be uniquely associated with depression at the mood, symptom, and syndrome levels. Research on automatic thoughts in depressed participants in both clinical and nonclinical samples shows that they score higher on the measures of negative self-referent cognitions than controls (Crandell & Chambless, 1986; Dobson & Shaw, 1986; Kendall et al., 1989; Harrel & Ryon, 1983; Kendall et al., 1989; Ross, Gottfredson, Christensen, & Weaver, 1986) and that negative self-referent thinking is associated with the transient depressive mood or depressive symptomatology Blackburn, Jones, & Lewin, 1986; Hedlund & Rude, 1995; Hollon & Kendall, 1980; Hollon, Kendall, & Lumry, 1986). As depressed individuals improve, they tend to get more positive and fewer negative cognitions (Dozois, 2007). However, a number of studies (Ingram, 1990; Ingram & Wisnicki, 1988) failed to show that negativity is exclusive to depression.

Some studies have provided support in favor of the exclusivity hypothesis, although the evidence is not consistent. For example, when compared to nondepressed persons, individuals with depression endorse fewer positive automatic thoughts Ingram, 1989b; Ingram & Wisnicki, 1988). Moreover, inducing positive mood in patients with depression results in reporting of more positive thoughts (Ingram et al., 1995). However, analyses of literature indicate that due to methodological and conceptual flaws in research, most findings do not lend strong support for the decline in positive thinking in depression, when compared to other conditions, such as anxiety (for reviews of literature, see D.A. Clark et al., 1999; D.A. Clark & Steer, 1996). The exclusivity hypothesis has also been challenged in terms of its universality of application to all depressive disorders, as some think it may not be applicable to all subtypes of depression (Abramson, Metalsky, and Alloy, 1989; cited in D.A. Clark & Steer, 1996) or is outdated altogether (Haaga, Dyck, & Ernst (1991).

After reviewing relevant research, Kendall and Hollon (1981) came to the conclusion that the frequency of positive cognitions may have a weaker association with depression than the frequency of negative cognitions.

Depression and the SOM and BSOM Models.

Kendall, Howard, and Hays (1989) conducted a test of the original SOM model in depression with college student and clinical adult samples (cited in Schwartz, 1992). They found support for the model in that nondepressed controls exhibited positive and negative cognitions that fit the "golden section" SOM predictions, whereas depressed students' cognition ratios fell within the predicted lower range of internal dialogue of conflict. Psychiatric depressed patients were within the lower range. Similarly, Burgess and Haaga (1994) established that positive cognitions theoretically specific to depression fit the predictions of the SOM model. Another study by Garamoni et al. (1991) in a clinical sample also yielded support for the SOM model in depression. Additionally, Schwartz et al. (2002) supported the utility of the revised BSOM point for tracking treatment changes in depressed patients.

Next, the theoretical models of content differentiation of anxiety and depression are introduced and the empirical support for those models reviewed.

2.7.5 Models of Cognitive Specificity of Anxiety and Depression

2.7.5.1 Cognitive Content Specificity Model

Thought content has been well studied (Kendall & Ingram, 1989) and yields stronger evidence for specificity than most other variables (Kendall & Watson, 1989). The *cognitive content specificity* (CCS) *hypothesis*, originally postulated by A. T. Beck (1976), reads that each psychopathological condition has a distinct cognitive profile that is manifested primarily in the content and form of the cognitions and processes associated with it. Presumably, CCS hypothesis can allow one to differentiate within a variety of maladaptive conditions. However, it has been mostly used when looking at depression- and anxiety-relevant cognitions and in conjunction with Beck's valence-based negativity and exclusivity hypotheses (discussed above). Thus, within Beck's model, depression-relevant cognitions have been typically regarded as more negative (pessimistic) than those of anxiety. No specific predictions were generated regarding a comorbid condition,

although it was implicit in Beck's theory that such condition would produce the most dysfunctional cognitions than either those with anxiety or depression, due to the presence of both anxious and depressogenic schemas.

In addition to content, the CCS hypothesis includes such intracognitive components as form (mode), degree of certainty, and degree of modifiability. It has been long hypothesized that depression is uniquely manifested in automatic thoughts that are definitive, self-referent, past-oriented, and rigid; whereas anxious thoughts tend to be more future-oriented (involve uncertainty about the future), less absolute, and more situation-dependent (A.T. Beck et al., 1987; D.A. Clark et al., 1999; Ingram & Kendall, 1987; Watson & Kendall, 1989). Various explanations for this have been offered that reflect complementary or alternative explanations to Beck's model. For example, Dobson (1985) suggested that both disorders involve a perception of threat (to self-esteem, happiness, or ability to cope), only in anxiety a threat is potential, whereas in depression it is either imminent/certain or has already occurred. Tellegen (1985) speculated that "depressive states are characterized by affective disengagement and that the associated [cognitions] are indicative of an "oriented" or "knowing" mode; in contrast, affectively engaged states such as anxiety reflect an "orienting" or "asking" mode (A.T. Beck et al., 1987, p. 182). Klinger (1996) proposed that when "an individual encounters a cue that arouses emotions because of its association with one of the individual's current concerns," a shift in the topic content occurs (p. 19). Anxiety is a response to the cues indicating a threat to the individual's goal; therefore, the thought content is future-oriented. Depressed individuals seem to think that their goal pursuit is blocked and, thus, strive to disengage themselves from the "lost cause" (Klinger).

2.7.5.2 Empirical Evidence for Cognitive Content Specificity

Content specificity hypothesis has spawned prolific research tapping into cognitive differentiation of anxiety and depression, including development of research instruments that could be used to test its theoretical assumptions. Unfortunately, the aspects of cognitions other than content and valence received little empirical attention. In

one study by D.A. Clark (1986), participants were compared on several parameters. Frequency of depressive thoughts was found to uniquely correlate with depression, whereas it was the intensity of thought that was found to characterize anxiety. In some studies (Epkins, 1996, with children), the future orientation of anxious cognitions was inferred from cognitive errors of generalization and personalization that appeared to differentiate socially anxious children from depressed ones.

Results of CCS studies vary depending on characteristics of samples. In clinical and referred samples, the results have been mostly conclusive. Research supports the depression-anxiety group differences, as well as a closer association between thoughts of loss and failure and depressed mood and between cognitions of harm and danger and anxiety (A.T. Beck, Brown, Steer et al., 1987; D.A. Clark, Beck, Brown, 1989; D.A. Clark, Beck, & Beck, 1994; D.A. Clark, Steer, Beck, & Snow, 1996; Woody et al., 1998).

In contrast, support for CCS in nonclinical populations including college students (or mixed nonclinical and referred adult samples) has been more ambiguous. Some (Sanz & Avia, 1994) found considerable evidence for the anxiety-depression differentiation. Others (Bruch, Mattia, Heimberg et al, 1993; Calvete et al., 2005a; D.A. Clark, 1986; Ingram, 1989b) found more support for depression content specificity relative to anxious cognitions. For example, Calvete et al. (2005a) discovered that depressive symptoms were uniquely associated with depressive cognitions, but anxiety scores were associated with both anxious cognitions and depressive cognitions. An investigation of the content of worry in a clinical sample yielded more specificity for depression and less for anxiety (Diefenbach et al., 2001). Further, Burgess and Haaga (1994) showed specificity of positive cognitions to depression rather than anxiety. In contrast, a few studies (Rholes, Riksind, & Neville, 1985; Wickless & Kirsch, 1988) found more evidence in favor of specificity of anxious cognitive content rather than that of depression. In Wickless and Kirsch's (1988) study, anxiety was uniquely predicted by cognitions of threat, whereas depression was predicted by cognitions of both threat and loss, although both anxiety and depression showed close association with their respective cognition themes. In Rholes et

al.'s (1985) study, threat cognitions were associated with anxiety only, whereas loss cognitions were related with both depression and anxiety. Calvete et al. (2005b) established that in addition to vulnerability to harm/illness schema specific to anxiety, dependence schema (traditionally associated with depression) contributed to anxious thoughts in addition to depressive thoughts. It was also discovered that consistent with the CCS predictions, the mixed group was frequently the most dysfunctional (Bruch et al., 1993; Woody et al., 1998), with an implication that depression and anxiety may have an additive effect on the level of pathological cognitions resulting in cognitive distortions beyond those with "pure" manifestation of either disorder.

The findings of the studies on cognitive products with children and adolescents have been mixed. While some supported content specificity (Schniering & Rapee, 2004), others did not lend unequivocal support in that depressive cognitions were shown to correlate with both depression and anxiety (Epkins, 1996; Rholes, Riskind, & Neville, 1985) and depressive cognitions evidenced better group differentiation than anxious cognitions (Jolly, 1993; Laurent & Stark, 1993). Based on a frequent lack of specificity with nonclinical populations and children it has been speculated that higher levels of distress may result in better manifestation of the specificity hypothesis (D.A. Clark & Steer, 1996). Recently, R. Beck and Perkins (2001) conducted a meta-analysis of correlational research on cognitive content specificity. They found only partial support for the hypothesis, revealing some degree of specificity for the depressive content but little specificity for the anxiety content. An additional finding was that the measures of depressive and anxious content were highly correlated (r = .66). The authors concluded that such lack of specificity for the anxiety measures can be in part due to a multidimensional nature of the anxiety construct, which was measured too broadly in the reviewed studies, or the high correlation between the measures of cognitive content.

While the original CCS hypothesis outlines cognitive factors that differentiate between anxiety and depression, its conceptualization of their overlapping features is less clear and is better described by the tripartite model (presented below).

2.7.5.3 Tripartite Model

The tripartite model has evolved from the two-factor positive-negative affect model (Watson, Clark, & Carey, 1988; Watson & Tellegen, 1985), which emphasized two basic orthogonal dimensions of emotion, i.e., negative affect and positive affect. The construct of *negative affectivity* is characterized by nervousness, hostility, fear, somatic complaints, negativity, and low self-esteem. Conversely, *positive affectivity* is marked by activity, enthusiasm, and excitement (D.A. Clark et al., 1999; Kendall & Brady, 1995). Hierarchical in nature, the *tripartite model* (L.A. Clark & Watson, 1991) has emerged as a main competitor to the single-level CCS model. Although considered mostly affective rather than cognitive, the tripartite model is frequently extrapolated to account for the differences in cognitions between depression and anxiety. The model proposes that depression and anxiety have negative affectivity in common (a higher-order, nonspecific factor), whereas only depression involves low positive affectivity (anhedonia) and only anxiety involves heightened physiological arousal (as part of lower-level specific factors) (L. A. Clark & Watson).

Based on the tripartite model, it can be assumed that both depression and anxiety would be associated with more negative cognitions, whereas only depression would be related to less positive cognitions (a prediction similar to Beck's exclusivity hypothesis). Due to the absence of direct predictions about comorbidity, it can be inferred that it would be characterized by low positive affectivity (fewer positive cognitions), high negative affectivity (more negative cognitions), and high physiological arousal (Shankman & Klein, 2003). Thus, the predictions of the tripartite and CCS models differ in their view of negative thinking. In the latter, negativity is linked to depression exclusively and not to both. Other affective structural models of anxiety and depression that yield predictions similar to the tripartite model (e.g., Davidson, 1998; Heller & Nitschke, 1998; both cited in Shankman & Klein) have also surfaced (for a review, see Shankman & Klein).

2.7.5.4 Empirical Evidence for the Tripartite Model

Support in favor of the affective aspects of the tripartite model has been substantial in adult clinical samples (Brown et al., 1998; Dyck, Jolly, & Kramer, 1994; Steer, Clark, Beck, & Ranieri, 1995), college students (e.g., Joiner, 1996), mixed clinical and college samples (e.g., Watson, Clark, Weber et al., 1995), and children (Chorpita, Plummer, & Moffit, 2000; Joiner, Cantaranzaro, & Laurent, 1996). However, studies investigating its specific cognitive predictions have not been numerous (D.A. Clark, Steer, & Beck, 1994; Watson, Weber, Assenheimer et al., 1995) and most of such studies were either tests of the CCS model or examples of integrative efforts (discussed below in more detail).

Overall, literature provides considerable support for the tripartite model in that negative affectivity and related negative cognitions have been found to associate with both depression and anxiety and have failed to differentiate between psychopathology groups in a variety of samples (for a review of affective studies, see L.A. Clark, Watson, & Mineka, 1994). Westra and Kuiper (1996) found that besides depression and anxiety, Type A personality and bulimia were characterized by increased negativity of cognitions typical of depression, providing support for the common factor model with college students. In contrast, a positive affectivity factor has not been consistently linked to depression alone or shown to be more specific to depression than negative affectivity (D.A. Clark et al., 1994). Studies supporting the uniqueness of positive affectivity have demonstrated that low frequency of positive automatic thoughts clearly discriminates between depression and mixed depression-anxiety condition and other disorders, such as anxiety (Jolly et al., 1994) and that positive thoughts correlate more strongly with depressive symptoms (e.g., Burgess & Haaga, 1994). Conversely, others have demonstrated that low frequency of positive cognitions may be characteristic of both anxiety and depression (Ingram, 1989b). Further, Burns and Eidelson (1998) reanalyzed the tripartite model, using some of Watson, Weber et al.'s (1995) student and clinical samples, as well as an additional clinical sample. Their results did not yield a fit with the

model's predictions but, rather, with its predecessor, the two-factor model, prompting researchers to conclude that anxiety and depression are distinct entities although they may share common etiology.

2.7.5.5 Towards Improved Cognitive Content Specificity: Theory and Empirical Evidence

Many attempts to augment the original Beck's cognitive content specificity hypothesis have been made. Most such efforts include integrating several models and reformulating specific predictions, using a specific type of anxiety, and improving methodology. The tripartite model and Beck's CCS hypothesis are complementary (R. Beck et al., 2003) and can be successfully integrated, as the common factor can account for the correlation between cognitive measures of anxiety and depression. Also, cognitive content could be at the lower level of the hierarchy, while valence could be at its upper tier. One of the earliest endeavors to devise a framework that would account for both common and unique factors in various disorders (such as the tripartite model), yet incorporate familiar cognitive terminology, was made by Ingram, Kendall, and their colleagues in a *cognitive component model* of psychopathology Ingram & Kendall, 1987; Ingram & Malcarne, 1995; Kendall & Ingram, 1987; Kendall & Ingram, 1989). Their model is very useful when comparing a large body of research in depression and anxiety on cognitive variables. The three components of the model are: (1) critical or unique features, e.g., schematic content, temporal distortion, task-irrelevant thoughts (anxiety), anxiety- or depression-linked cognition, and content of automatic thoughts; (2) features common to several disorders, e.g., structural aspects of schema, self-absorption, predominant automatic processing accompanied by inability to reflect on thought accuracy, capacity limitations, and cognitive asymmetry in the balance of positive and negative thoughts; and (3) error variance, i.e., unpredictable individual differences in the expression of a disorder.

Recent revisions of the CCS hypothesis (D.A. Clark & Beck, 1989; D. A. Clark et al., 1999) reflect reformulation of Beck's original model in terms of Ingram's taxonomic

system. For example, Richard Beck and his colleagues (R. Beck et al., 2001; R. Beck et al., 2003) attempted to integrate the tripartite and CCS literature in anxiety and depression in order to create a more holistic picture of these conditions that would include cognitive, emotional, and physical components. They found initial empirical support for the improved model. High negative affectivity was found to correlate with worry, whereas low positive affectivity correlated with the construct of hopelessness (explored in a helplessness/hopelessness model of depression not addressed here). Thus, the unique factors differentiating depression from anxiety were low positive affectivity, as well as self-critical and hopeless thoughts. Anxiety was closer associated with physiological arousal, which was accompanied by panic-content automatic cognitions.

Other empirical evidence also speaks in favor of integration of the structural affective model (two-factor or tripartite) and CCS approach (Calvete & Connor-Smith, 2005, Cho & Telch, 2005; D.A. Clark, Beck, & Stewart, 1990; D.A. Clark, Steer, & Beck, 1994; Jolly, Dyck, Kramer, & Wherry, 1994; Jolly & Kramer, 1994; McGrath & Ratliff, 1993), although the obtained results were sometimes mixed. For example, there was conflicting support for specificity for depression, with some finding less specificity (Cho & Telch), yet others showing more specificity (e.g., Jolly et al., 1994). Also, studies differ in how much support was found for the common factor of the tripartite model, with more support for commonality than specificity in some studies (e.g., Jolly et al., 1994) and more support for CCS predictions in others (Cho & Telch). In Cho and Telch's study both positive and negative anxious self-statements were unique to anxiety, negative self-statements were unique to depression, but positive depressive self-statements were related to both depression and anxiety. Jolly and Kramer (1994) tested the two-factor model (i.e., negative and positive affectivity as higher-order factors) integrated with cognitive aspect of the CCS. Their study data, however, supported the tripartite-CCS integration model (i.e., a single negative affectivity common factor) (Jolly & Kramer).

As the tripartite model has been criticized for failing to address heterogeneity within the group of anxiety syndromes, Mineka et al. (1998) and Watson (2000) proposed

incorporating Barlow's (1991; Zinbarg & Barlow, 1996) hierarchical model of anxiety into the tripartite framework. In Mineka et al.'s model, the common component of anxiety and depression, i.e., broad distress (in Barlow's model – negative affect), remains similar to the tripartite model, but each anxiety and depressive disorder includes lower-level unique distinguishing components (1998). Hughes et al. (2006) found preliminary evidence for the affective aspect of the improved tripartite model. Recently, Watson (2005) proposed further enhancements to the tripartite model by proposing a distinction within the anxiety disorder group: (1) distress disorders (GAD and PTSD, group with MDD and DD) and (2) fear disorders (PD, agoraphobia, social and specific phobias, and possibly OCD). He also noted that there is evidence that positive affectivity is not uniquely linked to depression but also shows consistent negative associations with social phobia (e.g., Brown et al., 1998; Watson, Clark, & Carey, 1988; Watson, Gamez, & Simms, 2005; both cited in Watson, 2005). Further theoretical elaborations and research are needed for the crystallization of the cognitive dimensions of specific disorders.

Ambrose and Rholes (1993) hypothesized that the relationship between anxiety symptoms and threat mode cognitions is curvilinear and would depend on the frequency of negative cognitions. According to these researchers, it is likely that at low levels of negative cognitions, loss cognitions are associated with both anxious and depressive symptoms and only threat cognitions are associated with anxiety symptoms. However, at higher levels of negativity, both loss and threat cognitions may be highly associated with depression rather than anxiety because at those high levels, "perceived threat becomes partially equivalent to perceived loss, leading to a shift from anxiety to depressive symptom formation" (Ambrose & Rholes, 1993, p. 304). Empirical evidence for curvilinearity is equivocal. Jolly et al. (1994) found evidence to support this view with a clinical adult sample. In contrast, a study by D.A. Clark, Steer, Beck, and Snow (1996) did not find support using two different psychiatric adult samples.

The CCS model can be also integrated with the SOM/BSOM model. According to the SOM/BSOM model, specific disorders should be differentiated by the "direction,

magnitude, duration, and frequency of deviation from the optimal level" (Garamoni et al., 1991). Depressed or very anxious individuals are mostly hypothesized to be within the four lowest-ratio categories, depending on the degree of severity, from the lowest (Conflicted Dialogue) to the highest (Negative Monologue). Little research in adults has been conducted to test the integrated model, with most results being equivocal. Calvete and Connor-Smith (2005) mostly found support for the integration. In contrast, McDermut and Haaga (1994) established cognitive specificity of depression based on the depression-relevant SOM, but there was no cognitive specificity found when anxiety-related thoughts were explored in relation to anxiety. Similarly, mixed support was found for the integration of the SOM and content specificity when using children samples (Kendall & Treadwell, 1996; Ronan & Kendall, 1997). McKellar, Malcarne, and Ingram (1996) integrated the tripartite model with the SOM model. They examined self-statements of college students in varying affective states, including negative affectivity (NA), depression, and anxiety. Participants who were comorbid in depression, anxiety, and NA had lower ratios than those with "pure" condition manifestation, which in turn were lower than those for control group. Calvete et al. (2005a) found that the BSOM ratios and negative self-statements were closer associated with the symptoms of depression, anxiety, and anger than positive self-statements.

In addition to integrating several models, some attempted to analyze the relationship between specific anxiety disorders and depression in order to improve specificity. It has been proposed that specific forms of anxiety would show better cognitive content differentiation from depression than generalized anxiety measures (R. Beck & Perkins, 2001; Cho & Telch, 2005; Ingram et al., 1987; Kendall & Ingram, 1989). Arguably, social phobia has generated the most substantial body of content specificity research of all clinical anxiety disorders, possibly due to the availability and popularity of self-statement instruments in the area. However, most specificity studies of social phobia and depression produced mixed results (Bruch, Mattia, Heimberg, & Holt, 1993; Ingram, 1989a, 1989b; Johnson, Johnson, & Petzel, 1992; Sanz & Avia, 1994). The

results suggested difficulties in linking positive cognitions to depression and their variability depending on depression severity and, more importantly, depression and social anxiety having negative valence in common. Using structural equation modeling, Cho and Telch's (2005) findings supported cognitive content specificity of social anxiety and depression, with positive and negative anxiety-specific self-statements uniquely associated with social anxiety and negative depressive statements more closely associated with depression. However, positive depression-specific cognitions were linked to both anxiety and depression, contradicting the tripartite and CCS models. Similarly, Ingram (1989b) established specificity of negative content for depression but failed to find specificity of positive self-statements in college students when compared to depression, as they were related to both depression and social anxiety. Also, in first study by Bruch et al. (1993), depression-specific negative thoughts covaried only with depression and social-anxiety negative content covaried with both social anxiety and depression. In a second study by the same researchers, which tested college students with social phobia varying in depressive affect (no, low-moderate, and high), those with highest levels of depression reported a lower percent of positive thoughts and significantly more negative thoughts than those with no comorbidity. Thus, Bruch et al.'s research offered evidence for specificity of depression but not social anxiety. In contrast, Sanz and Avia (1994, study 2) provided support for specificity of negative anxious content of social anxiety, which was found to be more related to social anxiety than to depression.

When looking at panic disorder, Woody et al. (1998) found that its cognition profile was uniquely different from that of depression but that depression profile included cognitions about terrible things that might happen (worry), which falls within the anxiety domain, in addition to depression-specific thoughts. Additionally, a comorbid group had troubles in social-evaluative and somatic domains, indicating an additive effect of social phobia and depression. D.A. Clark, Beck, and Beck (1994) also found support for theme-differentiated cognitions of participants with depression and PD but not for generalized anxiety disorder (cited in D.A. Clark & Steer, 1996), confirming the hypothesized difficulties of GAD and depression cognitive content differentiation.

A few researchers have attempted to include disorders or conditions other than anxiety and depression in their specificity designs, e.g., anger (Calvete et al., 2005a), externalizing behaviors (Calvete & Connor-Smith, 2005), and bulimia and Type A personality (Westra & Kuiper, 1996). For example, in a study by Westra and Kuiper (1996), cognitions pertaining to failure and loss were unique to depression, whereas interpersonal evaluation concerns were more unique to anxiety. An overlap in cognitive content was also observed, as performance evaluation concerns and a subset of depressive cognitions (including low self-worth) were also related to anxiety, as well as to bulimia and Type A personality. Other studies including additional conditions had mixed results (Sanz & Avia, 1994; Calvete et al., 2005), failing to differentiate between all disorder groups on all variables and supporting validity of the common-factor approach.

Finally, some researchers speculated that that the ambiguity of findings can be attributed to the flaws in methodology and assessment (Feldman, 1993; Ingram, 1989a; Jolly et al., 1994; McGrath & Ratliff, 1993). Some suggested that content discrimination between anxiety and depression measures could be improved by including items that contain more specific cognitions (R. Beck et al., 2003; D.A. Clark, Steer, Beck, & Snow, 1996). Recent CCS research has focused on refining anxiety content measures. For example, Molina et al. (1998) discovered that anxiety (GAD) was associated with higher frequency of somatic anxious words, catastrophization, and rigid, rule-bound interpretation, compared with depressed and control participants. Also, R. Beck et al. (2003) successfully used a multidimensional cognitive assessment tool to address the heterogeneity of anxious cognitive content.

2.7.6 Summary

Since most believe that depression and anxiety are not the same construct, differentiating between the two based on their relevant cognitive elements has become the focus of many cognitive theorists. In devising various theoretical explanations, the researchers have centered on automatic cognitions. The predominant models in the area

are Aaron Beck's content specificity hypothesis (often used with Beck's negativity and exclusivity hypotheses) and the tripartite model. According to Beck's conceptualization, depression and anxiety have their unique cognitive content reflective of specific schemas. Additionally, depressive content is more negative, self-focused, and less positive, compared to that of anxiety. The rivaling tripartite model indicates that depression and anxiety have high negative affect in common, while they could be differentiated based on low positive content (unique to depression) and high physiological arousal (unique to anxiety). Content specificity research yields mixed results, with specificity not as consistent in certain populations (e.g. in nonclinical samples and youths), with more generalized types of anxiety and measures, and measures of anxiety symptoms. Literature indicates that integrating several models of cognitive specificity, investigating specific types of anxiety, and using measures with better discriminant validity may be beneficial for the detection of differences between depression and anxiety

Test anxiety is one of well-studied specific forms of anxiety. Conceptualization of test anxiety is introduced next, along with its prevalence, course, and sex differences. Subsequently, a cognitive system of test anxiety and theoretical and empirical underpinnings of cognitive content specificity of test anxiety and depression are reviewed.

2.8 Test Anxiety

2.8.1 Conceptualization

In the current age of technology, evaluations are so widespread and pervasive that they have become a powerful source of anxiety for many. "We live in a test-conscious, test-giving culture in which the lives of people are in part determined by their test performance" (S.B. Sarason, 1959, p. 26). The tendency of a person to become anxious under evaluative conditions, particularly testing, has come to be known as test anxiety. The official start of the large-scale anxiety research dates back to the early 1950s. Since then, much theoretical work has been done in capturing this elusive concept. Test anxiety has been defined within various frameworks including motivational/drive models

Atkinson & Feather, 1966; Mandler & Sarason, 1952; Spence & Spence, 1966); personality models (e.g., Hill, 1972); cognitive-attentional models (Wine, 1980, 1982; Sarason & Sarason, 1986); cognitive-motivational models (Carver & Scheier, 1991; Covington, 1992); and transactional (interactionist) models (Spielberger & Vagg, 1995; Zeidner, 1997; Zeidner, 1998). Additionally, dual-deficit models (Meichenbaum & Butler, 1980) and social learning theory (Bandura, 1977, 1989; cited in Smith, Arnkoff, & Wright, 1990) contributed to the field of test anxiety study. Research in test anxiety has been criticized for being "decontextualized", but more comprehensive models are starting to surface (e.g., Bodas & Ollendick, 2005). Arguably, a model that takes into consideration the entire complexity of test anxiety is yet to be developed (Zeidner, 1998). Currently, interactionist approaches, which focus on the connections between the multitude of test anxiety elements, appear to be most popular in the field.

Test anxiety research often parallels or borrows from that on general anxiety. For example, researchers differentiate between cognitive (irrelevant thinking), physio-emotional (body reaction and perceived tension), and behavioral (avoidance of testing situations and procrastination) aspects of test anxiety. Testing appears to be a universally stressful process, and most people experience elevations in physiological arousal prior to and during testing, whether they are regarded test anxious or not (Deffenbacher & Hazaleus, 1985; cited in Carver & Scheier, 1986). However, it is students' cognitive and behavioral responses to the evaluative situation that are believed to be crucial in the differentiation of high and low levels of test anxiety (Carver & Scheier, 1986; Zeidner, 1998). Therefore, these aspects of test anxiety are considered particularly relevant for research and practice.

Like general anxiety, test anxiety is often viewed in terms of trait and state components and is most frequently defined as a situation-specific trait, i.e., one's disposition to react with elevated worry, mental confusion, intrusive thoughts, tension, and physiological arousal when exposed to evaluative situations (Sarason & Sarason,

1990; Spielberger & Vagg, 1995). Those high in trait test anxiety, presumably, show a higher increase in state anxiety in evaluative situations than those low in trait test anxiety.

Liebert and Morris (1967) were the first to outline the distinction between worry and emotionality within test anxiety (cited in Spielberger et al., 1995). Their research exemplifies how the conceptualization of test anxiety influenced the study of general anxiety. In the test anxiety domain, a cognitive element of *worry* is defined as a concern about one's performance on a test, as well as about implications and consequences of failure (Zeidner, 1998). *Emotionality* encompasses affective and physioemotional reactions, i.e., autonomic arousal (e.g., sweating, shaking, increased heart rate, muscle tension, and upset stomach). In addition to worry and emotionality, other dimensions of test anxiety may include cognitive interference and lack of confidence (Sarason & Sarason, 1990; Stober, 2004). Self-efficacy (or being able to control demands of the environment by engaging in some activity) has also been seen as contributing to test anxiety as a correlate of worry (Schwartzer & Jerusalem, 1992). Despite a consensus that worry and emotionality are present within test anxiety and anxiety in general and likely to contribute the most to its content (Hodapp & Benson, 1997), there is still a disagreement on how these concepts fit with other dimensions of anxiety. Some researchers believe worry to fall in the category of trait anxiety, whereas emotionality is thought to correspond to state anxiety (e.g., Sapp, 1999). Thus, research work on refining the conceptualization of test anxiety continues.

Test anxiety is frequently linked with poor test outcomes (particularly, its state worry component), overall academic underachievement, and compromised assessment validity (Hembree, 1988; O'Neil & Fukumura, 1992; O'Neil & Abedi, 1992; Spielberger, Gonzalez, Taylor, Algaze, & Anton, 1978; Tryon, 1980; Zeidner, 1998). However, the much researched direct association between test anxiety and performance is currently debated (Zeidner, 1998), as test anxiety has been proposed to be just one variable out of an array of multiple cognitive, emotional, motivational, physiological, and environmental factors that contribute to achievement. For example, Chapell and his colleagues found

that although female participants in their study had higher test anxiety, they also had higher GPAs (2005). Environmental and individual factors that have been implicated in test anxiety include students' academic abilities, study habits, school attitudes, classroom environment, enrichment opportunities, self-perception, and health (Zeidner, 1998). Increased test anxiety has been associated with the degree of test importance. High-stakes testing is thought to cause more test anxiety than low-stakes tests (O'Neil & Abedi, 1992). Test anxiety appears to be a cross-cultural phenomenon: although it does not exist outside of cultural context, it has not been always shown to be impacted by ethnicity (Zeidner, 1990; Zeidner, 1998).

2.8.2 Test Anxiety and Other Anxiety Disorders

Test anxiety is not classified as a clinical anxiety disorder and, thus, is not included in the *DSM-IV-TR* (2000). Consequently, unlike other anxiety disorders, it has been less subject to a categorical distinction and mostly treated as a dimensional concept. However, the issues in interpretation of test anxiety remain, since the condition that is most often mentioned in relation with test anxiety, i.e., social phobia, has a similar profile and is a clinical disorder in the *DSM-IV-TR*. "Social phobia is characterized by the desire to perform well in situations involving interaction with or observation by others, coupled with the fear that one will fail, and as a result, will meet with embarrassment, rejection, or negative evaluation" (Chambless & Hope, 1996, p. 345). Social phobia occurs far in advance to the exposure to threatening stimuli and, if intense and comorbid with other conditions, is associated with increased suicide ideation (*DSM-IV-TR*).

Test anxiety and social phobia have similar physiological, cognitive, affective, and behavioral symptoms and common antecedent correlates (Chambless & Hope, 1996; Sarason & Sarason, 1990; Purdon et al., 2001; Zeidner, 1997). Those with test anxiety and social phobia negatively evaluate the quality of their performance, are preoccupied with how others are judging them and how they appear to others, and anticipate failure and loss of regard by others. However, social phobia is manifested in the context of both social interaction and performance, while test anxiety is present only in the evaluative

domain of performance. In contrast to social phobia, which can be *generalized* (present in all social situations) and *specific* (e.g., fear of public speaking, fear of eating in public), test anxiety is fairly homogeneous across evaluative situations. It must be noted that specific subject test anxieties (e.g., math, statistics, and foreign language) are considered somewhat different from generalized test anxiety because they include a content component in addition to the performance component (Benson, 1989).

Zuriff (1997) advocates interpretation of test anxiety as a possible manifestation of social phobia, warranting special accommodations under the Americans with Disabilities Act (1990) for those who have the symptoms and have an educational need (e.g., much lower performance than could be expected based on the student's potential). Beidel and Turner (1988) found that 60% of the highly test anxious schoolchildren in their study met the *DSM* criteria for an anxiety disorder, with social phobia being a common diagnosis (cited in King, Mietz, Tinney, & Ollendick, 1995).

Many view test anxiety as a special case of the broader class of evaluative anxiety disorders (which also include performance anxiety and social phobia) (A.T. Beck & Emery, 1985; Trower, Guilbert, & Sherling, 1990; Wine, 1982; Zeidner, 1998). Trower and his colleagues contend that individuals experience similar evaluation anxiety across different situations, which can be grouped into three categories: (1) social situations (e.g., a party); (2) school or vocational situations (e.g., taking a test, having one's performance evaluated, or participating in athletic competition); and (3) interactions with the outside world (e.g., shopping or traveling) (1990). According to this view, both test anxiety and social phobia would be classified as evaluative anxiety disorders. Overall, it is not clear how test anxiety should be addressed clinically and whether it is (1) a separate disorder that frequently co-occurs with social phobia, (2) merely one of the manifestations or symptoms of social phobia, or (3) a disorder that shares vulnerability or a common factor with it.

Most research in the area of test anxiety has been psychoeducational and generated models that are specific to test anxiety and do not necessarily allow for the

inclusion of other types of anxiety disorders (Sarason, Sarason, Keefe, Hayes, & Shearin, 1986; Wine, 1980). Test and evaluation anxiety have been investigated predominantly with nonreferred undergraduate students rather than clinical populations. On the other hand, popular clinical models involving anxiety (A.T. Beck, 1976) have not been well explored using test anxious individuals. Test anxiety has generated a large body of intervention programs and therapeutic techniques. Also, it is generally mentioned as one of the key contributors to the decrease in physical and mental health and school adjustment (Hembree, 1988; Spielberger, Gonzalez, Taylor, Algaze, & Anton, 1978; Zeidner, 1998). Lastly, test anxiety construct may prove useful when generalizing to other evaluative anxiety disorders. Thus, research of test anxiety has clinical utility.

2.8.3 Prevalence and Course of Test Anxiety

Prevalence of test anxiety is evident, albeit not widely documented, partly due to methodological and definitional problems. High test anxiety levels may be present in as many as 25-30% of American school-age students (Nottelmann & Hill, 1977; cited in McDonald, 2001). Prevalence of test anxiety might have increased over time, due to exposure to testing at a younger age and increased reliance on testing, although the estimates may differ depending on the assessment method (McDonald, 2001). In college student populations test anxiety rates run at approximately 15% and may be higher (Hill & Wigfield, 1984). In the study by Zeidner and Nevo (1992), 16% of the college admission sample from Israel rated themselves high in overall test anxiety (measured by the high frequency on at least 50% of endorsed symptoms). In Chapell et al.'s (2005) study, approximately 16% of the mixed-sex undergraduate sample reported high test anxiety, compared to 17% from the graduate sample. No differences in test anxiety were found within the graduate group, i.e. between master's and doctoral students (Chapell et al.).

Scanty research in developmental patterns of test anxiety highlights a consistent rise in levels of test anxiety through elementary school (stabilizing towards its end), then a peak in junior high school, leveling off or a mild decline throughout the rest of high

school, and a slow decline in college (Hill & Sarason, 1966; Manley & Rosemier, 1972; Pekrun & Frese, 1992; Wigfield & Eccles, 1989). Overall, literature suggests that by the end of high school, students may have established levels of test anxiety that are less likely to fluctuate over time. The following explanations for the age increases throughout grade school have been offered including: (1) increased demands for academic achievement from significant others over the school years; (2) increased value of social (peer) comparison; (3) increased complexity of learning materials and tasks/increased frequency of testing; (4) cumulative effects of failures and other aversive experiences; (5) decrease in children's defensiveness; and (6) increase in the accuracy and reliability of self-report over the school years (McDonald, 2001; Zeidner, 1998).

2.8.4 Sex Differences in Test Anxiety

Being a woman or a man is often believed to have an effect on test anxiety's development and manifestation. Group sex differences have pointed to overall higher test anxiety levels in grade-school and college women across various countries (Benson, 1989; El-Zahhar & Hocevar, 1991; Seipp, 1991; Sowa & Lafleur, 1986; Spielberger et al., 1980; Zeidner, 1990). Hembree's (1988) meta-analysis highlights that sex differences start emerging during the middle years of elementary school and persist through high school and college. However, despite the consistent observations of findings, the magnitude of these differences is relatively small and could vary depending on the level of anxiety. The meta-analytic reviews of literature found sex groups separated by less than one third of a standard deviation, with the difference larger on the emotionality factor than on the worry factor (Hembree; Seipp & Schwartzer, 1996). A large-scale study with undergraduate and graduate students Chapell et al. (2005) found that the actual differences were not of great magnitude: high test anxious undergraduate women (i.e., at least one standard deviation above the mean) constituted approximately 16.5% of the sample, compared to about 14.5% men. In a graduate sample, about 18% of women reported high test anxiety versus 14% men (Chapell et al.). In a study by Sowa and

LaFleur (1986), women reported greater symptom intensity for both social anxiety and test anxiety.

Several explanations have been proposed to account for differential manifestation of test anxiety in women and men. Drawing on the psychodynamic theory, women have been considered to be more uncomfortable and self-conscious in testing situations. Research generally supports women's evaluative sensitivity (Arch, 1987; Lewis & College, 1987; both cited in Zeidner, 1998). For example, women have been frequently found to undervalue and underpredict their performance compared to men (see Wine, 1980, for a review), and their self-efficacy appears to be lower than that of men (Arch, 1987; cited in Zeidner, 1998).

Some hypothesized that women and men yield disparate interpretations and responses in evaluative circumstances, with men perceiving testing as a challenge (facilitating their performance), and women viewing it as a threat (performance-debilitating) (Lewis & College, 1987; cited in Zeidner, 1998). Couch, Garber, and Turner (1983) validated the hypothesis, showing more debilitating anxiety in women. Similarly, Jerusalem (1985) suggested that individual's sex is an important moderator in a test anxiety-performance relationship. In contrast, studies by Zeidner (1990) and by Payne, Smith, and Payne (1983b) did not show one's sex to interact with test anxiety in affecting performance, although facilitating and debilitating anxiety were not assessed separately. Spielberger et al.'s (1980) research found a weak association between test anxiety and performance for both men and women.

A psychosocial approach names differential socialization and styles of child rearing of boys and girls responsible for sex differences (Deaux, 1977; Maccoby & Jacklin, 1974; both cited in Zeidner, 1998). Society tends to be more tolerant of test anxiety in women, making its expression socially acceptable and reinforcing (Hill, 1972; Hill & Sarason, 1966). For men and boys, on the other hand, it is less acceptable to admit their feelings, which leads to their higher defensiveness scores and, ultimately, to sex differences in test anxiety report (Hill & Sarason, 1966). The differential report

hypothesis has received some empirical support in that when using different cutoffs for the test anxiety-assessing instruments for different sexes, the gap in scores tends to disappear (e.g., Turner, Beidel, Hughes, & Turner, 1993**;** cited in McDonald, 2001).

2.8.5 Cognitive System in Test Anxiety

It has been observed that some students with good study habits and preparation experience test anxiety even on routine examinations, leading theorists to suggest that test anxiety, at least in part, could be attributed to pathological beliefs and resulting maladaptive thoughts. Lending credibility to the cognitive model, cognitive therapy has been found effective in reducing test anxiety and seems to generalize from individual settings to school settings (Sarason & Sarason, 1990). As early as 1978, Irwin Sarason hypothesized that test anxiety results from (1) expectations that a task is too difficult or the person is inadequate (or both) and (2) anticipation of failure. Although it is the emotionality component that has received the most attention from empirical researchers and theorists (Spielberger et al., 1980), cognitive processing components of test anxiety, such as metacognition, cognitive, attentional, and memory biases, cognitive capacity, cognitive interference, and cognitive appraisal have been investigated in many recent studies (Arkin, Dutchon, & Maruyama, 1982; Cassady, 2004; Cassady & Johnson, 2002; Dewhurst & Marlborough, 2003; Everson et al., 1994; Friedman and Bendas-Jacob, 1997; Hedl, 1987; Hunsley, 1985; Lang et al., 1983; Spada et al., 2006). Cognitive aspects of test anxiety have been also implicated in several contemporary models (Dutke & Stober, 2001; Keogh, Bond, French, et al., 2004) and measures of test anxiety (Friedman & Bendas-Jacob, 1997; Cassady & Johnson, 2002). The existence of faulty beliefs in test anxiety has been empirically supported (Pekrun, 1984).

Consistent with the mode of threat, high test anxious students allocate a disproportionately large share of resources to the threatening stimuli of an evaluative nature, exaggerating the objective dangers generated by the environment and downplaying the safety-related stimuli (D. A. Clark & Beck, 1989; Dombeck, Siegle, &

Ingram, 1996). Once an exam approaches, the student's orientation becomes linked with a possibility of failure and includes such potential consequences as "a blow to…self-esteem, an obstacle to future plan, a personal defeat, a disgrace in the eyes of…friends, [and] disappointment to…family....As the notion of threat takes hold, there is an automatic shift in [the] cognitive organization to a 'vulnerability set'….Attention is drawn to various possible weaknesses – omissions in [the] coverage of the material, deficiencies in comprehension, difficulties in collating and expressing what…has [been] learned" (A.T. Beck, 1989, p. 109). As the test goes on, the flaws in knowledge, understanding, and responses are exaggerated. Students with high levels of test anxiety cannot alter their vulnerability set. Some may go from the defensive phase to the helpless phase or respond with a panic attack (A.T. Beck).

In contrast to non-test-anxious individuals, those with test anxiety tend to frequently experience task disengagement and are flooded with involuntary thoughts that are highly distractive (Carver & Scheier, 1986; Zeidner, 1998). Individual's trait test anxiety may predispose one to experience interference on tasks across many situations that are perceived as evaluative, e.g., athletics and social interaction (Pierce et al., 1996). An elevated state test anxiety component will ensure that an individual will experience intruding thoughts on a particular test. Studies of cognitive interference found a considerable support for the process occurring in test anxiety (Blankenstein et al., 1989; Frantisek, Stuchlik, & Hagtvet, 1992; Sarason et al., 1986; Zatz & Chassin, 1985).

Besides cognitive interference, cognitive processes in test anxiety are characterized by biases in attention, memory, and selection. Test anxious students typically exaggerate the negative or recall similar experiences of physiological arousal and/or failure. They also tend to downplay the positive and disregard any successes or pleasant evaluative experiences (Purdon, Antony, Monteiro, & Swinson, 2001; Zeidner, 1998). Highly test-anxious participants accept more of the negative anxiety-relevant material as self-descriptive than their low anxious counterparts (Lang et al., 1983;

Mueller & Thompson, 1984). The results point to the existence of the selective attentional negative bias congruent with the test anxious schema.

2.8.6 Automatic Thoughts in Test Anxiety

Test anxious cognitions have been widely researched, mostly due to the aforementioned link with performance (e.g., via cognitive interference process). In terms of their content, the intrusive automatic thoughts of test anxious students are thought to focus on the following themes: (1) the self (e.g., perception of inadequacy and doubts about ability to cope with threatening situations and about academic competence); (2) the task (e.g., performing well on the test and perceived difficulty of the questions); (3) escape from a threatening situation (e.g., off-task matters); and (4) social evaluation (e.g., meeting expectations of others, comparing themselves with other students, and perceived possibility of negative evaluation) (Carver & Scheier, 1987; Hunsley, 1987; Pierce, Henderson, Yost, & Loffredo, 1996; Sarason et al., 1986; Sarason & Sarason, 1990; Schwarzer & Jerusalem, 1992; Zeidner, 1998).

Notably, the cognitive aspects of the self, social evaluation, and avoidance have also been investigated in social phobia research (Alden, Mellings, & Ryder, 2001; Beidel, Turner, & Dancu, 1985; Clark & Wells, 1995; Glass & Furlong, 1990; Hope, Gansler, & Heimberg, 1989; Leary, 2001; Rapee & Heimberg, 1997; Stopa & Clark, 1993; Tanner, Stopa, & De Houwer, 2006; Wilson & Rapee, 2006; Vassilopoulos, 2004). Interested reader is also referred to the reviews of literature in the area (Alden & Taylor, 2004; Allen & Page, 2005; Amir & Foa, 2001; Foa, Franklin, & Kozak, 2001; Hirsch & Clark, 2004; Hofmann, Heinrichs, & Moscovitch, 2004; Hook & Valentiner, 2002; Spurr & Stopa, 2002). Thus, it appears that it is the task- (test-) related content (including escape from the evaluative situation) that sets test anxiety apart from social phobia.

Self-preoccupation and self-focused attention under evaluative circumstances is postulated by some researchers to be the most salient characteristic of test anxious individuals compared to their low test anxious peers (Carver & Scheier, 1987; Sarason,

1980; Wine, 1980, 1982; Zeidner, 1998). Research corroborates the self-related thought patterns of test anxious individuals compared to low anxiety persons (Blankenstein, Toner, & Flett, 1989; Galassi, Frierson, & Sharer, 1981a, 1981b; Sarason et al., 1986). Task-relevant as well as task-irrelevant content of test anxious cognitions have been also supported by research (King et al., 1995; Sarason et al., 1986).

The valence of automatic thoughts in test anxiety has been examined in various aspects, alone and in conjunction with other cognition parameters, e.g., quantity of negative and/or positive thoughts, frequency of negative and positive thoughts, and the degree of one's belief in negative thoughts. Overall, research results indicate that those with high test anxiety generate a negatively-colored cognition stream, characterized by higher numbers and frequency of negative and lower frequency and numbers of positive thoughts, compared to those with low test anxiety (Blankstein & Flett, 1990; Blankstein, Flett, Boase, & Toner, 1991; Bruch, Kaflowitz, & Kuethe, 1986; Galassi et al., 1981a, 1981b; Hunsley, 1987b; King et al., 1995; Zatz & Chassin, 1983). The same tendency is evident in social phobia (Beidel, Turner, & Dancu, 1985; Stopa & Clark, 1993). Additionally, test anxious individuals believe more in the plausibility of their self-deprecatory cognitions than their low test anxious counterparts (Bruch et al., 1986). Minor and Gold (1986) measured test anxiety during an exam and one week later. They discovered that negative thoughts (as well as self-reported arousal) were consistent over time, while positive thoughts were unstable, pointing to the possibility of negative thoughts being a more ingrained part of the test anxious schema. When reviewing self-statement research, Zeidner (1998) underscored that the relationship of test anxiety and negative thoughts has not received consistent support in the literature, prompting some researchers (e.g., Blankstein et al., 1991) to speculate that test anxiety is related more strongly to low positive rather than high negative cognition. However, the connection between high negative cognition and test anxiety continues to intrigue researchers, as even imagining a testing situation is likely to evoke negative thinking in test anxious students (Heimberg, Nyman, & O'Brien, 1987; cited in Zeidner, 1998).

2.8.6.1 Test Anxiety and the SOM and BSOM Models

Robert Topman and his colleagues from the Netherlands found that the SOM ratios of the highly test anxious students (.4; Failed Coping Dialogue in the BSOM model) were more dysfunctional than those of students with low test anxiety (.9; Positive Dialogue) (Topman et al., 1992). Another study by the same group of researchers found that highly test anxious freshmen had a mean SOM ratio of .49 (Conflicted Dialogue in the BSOM model), versus .66 (upper end of Successful Coping Dialogue) in students with moderate test anxiety and .81 (Positive Dialogue) in those with low test anxiety (Topman, Kleijn, & van der Ploeg, 1997). In a study of evaluation anxiety in graduate students, Arnkoff, Glass, and Robinson (1992) demonstrated the connections between the SOM model and test anxiety in different phases of an evaluative situation. However, negative thoughts alone were also related to test anxiety. Glass et al. (1995) investigated cognitions during a career-related exam. In their study, it was negative thoughts and not the SOM ratios that uniquely contributed to test anxiety.

2.8.7 Summary

Test anxiety is a well-researched construct with practical applications. It has multiple components and has been conceptualized in a number of ways from various perspectives, with no one model capturing it in its entirety. Test anxiety is closely associated with the clinical condition of social phobia but is typically measured as a continuous variable through self-report instruments. It is highly prevalent in youths and although it may stabilize during college years, the rates remain high. Preponderance of test anxiety in women over men seems to be consistent throughout the world, although the differences are not of great magnitude and it is still unclear whether they could be mostly attributed to differential endorsement on self-report measures. Test anxiety has been linked to the biased cognitive processing, frequent dysfunctional automatic thoughts interfering with test performance, and few positive thoughts. Although research in test anxiety has been mostly in the educational field, the condition lends itself to further examination, with the possibility of its integration into the clinical models.

2.9 Cognitive Content Differentiation of Test Anxiety and Depression

2.9.1 Comorbidity of Test Anxiety and Depression

Like clinically-defined anxiety disorders and anxiety symptoms, test anxiety has been found to co-occur with depression (Beidel & Turner, 1988; King et al., 1995; McDonald, 2001). Several correlational studies found a mild-to-moderate association between the two conditions, ranging from .36 to .50 (Comunian, 1989; Flett & Blankstein, 1994; Zeidner, 1994). Comorbidity of test anxiety and depression is common among college students. Strack, Blaney, Ganellen, and Coyne (1983) found that depressed students had significantly higher levels of test anxiety than nondepressed students (cited in Gotlib, 1984). Both conditions are associated with important clinical variables, such as suicide ideation (*DSM-IV-TR*, 2000; Lee, Wong, Chow, & McBride-Chang, 2006). In addition to the overlap with the symptomatic measures of depression, test anxiety has been theoretically and empirically connected to the same cognitive variables traditionally associated with depression, e.g., self-focused cognitions and high frequency of negative cognitions and low frequency of positive cognitions (see sections *2.7.4* and *2.8.6*).

2.9.2 Empirical Evidence for Cognitive Content Specificity of Test Anxiety and Depression

Despite comorbidity of test anxiety and depression and the similarity of the cognitive constructs implicated in the maintenance of those disorders, specificity research investigating a cognitive link between the two conditions has been insufficient. Leitenberg, Yost, and Carroll-Wilson (1986) tested cognitive processing in depressed and test anxious children. They discovered that cognitive errors were common in both, implying a lack of differentiation between the two conditions at younger ages. There have been only a handful of studies in the area that addressed cognitive content specificity of test anxiety and depression in adults. Sanz and Avia (1994, study 1) were interested in the cognitive differences between self-report of college students with social phobia versus those with depression. Acknowledging the overlap between test anxiety and social phobia

and potential confounding issues, they included a test anxious group in their study in addition to socially anxious, control, and comorbid (depressed and socially- or test-anxious) groups. Test anxiety was found to have a cognitive profile different from that of social phobia in that test anxious students reported more interfering thoughts related to test situations. However, specificity of test anxiety compared to depression could not be established directly, since both comorbid and test anxious groups scored high on cognitive interference (relevant to test anxiety) and there was no "purely" depressed group.

Ingram et al. (1987) conducted the only cognitive specificity study that looked at the differences between depressed, test anxious, comorbid, and asymptomatic groups of college students. They compared subjects on several cognitive measures, including information processing and current cognitive activity. The data provided evidence for the patterns of both differences and similarities in depression and test anxiety. Favoring specificity, depressed students tended to engage in more negative self-referent automatic cognition, and recall more self-referent depressive information. In contrast, test anxious students reported more interfering cognitions and manifested selective processing of anxiety-specific information. The comorbid group reported more dysfunctional cognitions than any one of the other groups.

2.10 Statement of the Problem

The idea of cognitive content specificity implies that depression and anxiety have several unique cognitive features and, therefore, can be differentiated based on their respective content, which is typically exemplified by automatic thoughts (A.T. Beck, 1976). Within the CCS model, cognitions specific to depression reflect themes of loss, whereas anxiety-related thoughts revolve around themes of threat (A.T. Beck; D. A. Clark et al., 1999). Additionally, depression is thought be linked to more negative and less positive cognitions than anxiety. In contrast, hierarchical structural models (e.g., the tripartite model) propose that although depression has a unique feature of low positivity,

anxiety and depression have negative cognitions in common (L.A. Clark & Watson, 1991). The CCS model and the tripartite model have been explored with both clinical and nonclinical populations, children and adults, and using different methods. The data are somewhat ambiguous in that they favor depression specificity more than anxiety specificity (Ambrose & Rholes, 1993; A.T. Beck et al., 1987; Ingram et al., 1987; Laurent & Stark, 1993; Rholes, Riskind, & Neville, 1985). Research also indicated stronger support for negative content, but depression was not found to be uniquely characterized by low positive cognitions (Bruch et al., 1993). Such ambiguity in specificity research can be attributed to various factors, such as (1) the use of a nonspecific anxiety condition/disorder; (2) need for more integrative approaches to CCS; (3) the lack of appropriate assessment instruments and methodological limitations; and (4) characteristics of the sample.

Specific anxieties show less comorbidity and less diagnostic symptom overlap with depression than more generalized types of anxiety (*DSM-IV-TR*, 2000; Levine et al., 2001). Cognitive theorists proposed that in contrast to generalized anxiety, specific forms of anxiety have more narrowly-circumscribed schematic content and, therefore, they would be expected to manifest better differentiation from depression on cognitive measures (Epkins, 1996). For example, social phobia shows lower correlations with depression than several other specific anxiety disorders (Kessler et al., 1996; cited in Hadzi-Pavlovic, 2001; Mineka et al., 1998). Further, research on specificity of social phobia and panic disorder against depression has yielded mostly optimistic results (D.A. Clark et al., 1994; Sanz & Avia, 1994; Westra & Kuiper, 1996; Woody, Taylor, McLean, & Koch, 1998). As a specific nonclinical form of anxiety with well-studied cognitive components that is often grouped in the same class as social phobia and shows relatively little symptomatic overlap with depression, test anxiety should also show good, if not better, content differentiation from depression (Ingram et al., 1987).

Studying test anxiety has long been deemed important, given its prevalence and potentially debilitating emotional and performance-hampering effects. Test anxiety is

frequently comorbid with depression (McDonald, 2001) and, much like depression, it has been linked with increased negative and decreased positive thinking (Blankstein et al., 1991; Blankstein & Flett, 1990). Thus, the subject of cognitive content differentiation of test anxiety and depression warrants further investigation. Research looking into the cognitive specificity of test anxiety and depression has been virtually non-existent, possibly due to test anxiety being studied almost exclusively within the psychoeducational field. The few relevant studies with college students (Ingram et al., 1987; Sanz & Avia, 1994) involved differing methodologies and produced somewhat ambiguous findings. The current dissertation study built on previous research by examining automatic thoughts in test anxiety and depression.

Secondly, although there have been many studies using an integrative approach to CCS with anxiety and depression (R. Beck et al., 2001; R. Beck et al., 2003; Calvete & Connor-Smith, 2005; Cho & Telch, 2005; D.A. Clark, Beck, & Stewart, 1990; D.A. Clark, Steer, & Beck, 1994; Jolly et al., 1994; Jolly & Kramer, 1994), few studies have incorporated the SOM ratios into the CCS model when looking at college students (for exceptions, see Calvete & Connor-Smith, 2005; Calvete et al., 2005a; McDermut & Haaga, 1994; McKellar et al., 1996). To the author's knowledge, no study has yet looked at the difference in the cognitive ratios between depression and test anxiety on the disorder-relevant cognitions in college students. The BSOM approach (Schwartz, 1997) appears to have a potential for good differentiation because the ratios add greater quantitative precision to cognitive specificity and explain the role of positive cognition in psychopathology (Haaga, Dyck, & Ernst, 1991).

Some researchers speculate that it is chiefly limitations in methodology (e.g., assessment and procedure) that are to blame for the lack of adequate differentiation of anxiety and depression. For example, failure of some studies to include a group with both anxiety and depression results in the affective confounding (Ingram, 1989a). Upon Ingram's recommendations, this study included a comorbid group. Secondly, the present undertaking was the first one to use the measures of positive and negative automatic

thoughts relevant to depression and test anxiety within the framework of the combined CCS/Balanced States of Mind Model. Positive anxious cognitions have not been widely explored in specificity research, with exception of generalized anxiety and social anxiety studies (Bruch et al., 2003; Calvete et al., 2005a; Cho & Telch, 2005; McDermut & Haaga, 1994; Sanz & Avia, 1994). Yet positive self-statements are a useful tool in the CCS designs due to their role in psychopathology (Ingram & Wisnicki, 1988) and the tendency of depressed and anxious individuals to underreport positive thoughts. Also, the inclusion of the measures of test anxious positive and negative cognitions allowed for a direct comparison of the CCS and the CCS/BSOM models.

Following recommendations in the area, the current study utilized self-statement measures. Despite a few criticisms of self-report measures, many believe that they are important for the assessment of both anxiety and depression because they involve high level of self-focus, self-perceptions, and subjective evaluations of personal feelings (Kendall & Warman, 1996). Also, these measures supposedly tap underlying belief systems rather than situation-specific cognitive content because of the general and absolute nature of item content (Myszka et al.; Sturmer et al.). Thus, self-statements may provide a close link with the underlying schemas, which serves to strengthen Beck's theory. Furthermore, empirical research indicated that self-statements are not inferior to other assessment procedures in differentiating between anxiety and depression and remain stable representation of the subjects' cognitions over time (Arnkoff & Smith, 1988; Glass & Arnkoff, 1997). Methods of assessment other than self-statements (e.g., thought-listing procedure) may produce different SOM ratios and prevent adequate disorder differentiation. This has led researchers to conclude that to date self-statements remain the most reliable ways to calculate the SOM ratios (Bruch et al., 1990; Heimberg et al., 1990; Sturmer et al., 2002, Myszka et al., 1986).

Finally, sample characteristics, such as age and sex of participants, have been viewed as hindering disorder differentiation in the previous CCS research. Children and adolescents exhibit more comorbidity and possess less self-awareness need to complete

the self-statement instruments; thus, it may be more difficult to achieve full differentiation with this age group. Moreover, since it has been established that women differ from men in the levels of anxiety and depression and in the tendency to report more pathology, sex may be a significant confounding variable in the CCS research. Additionally, for specificity research addressing group differences, small group size has also been an issue, resulting in lowered power. Thus, this study used a sample of college-age women sufficient to form groups of a relatively large size.

In sum, the literature indicates that there is an apparent need to improve cognitive discrimination of test anxiety and depression. Although theoretical specificity frameworks are fairly well developed, few researchers have attempted to incorporate them into one study of test anxiety and depression. The current study added to the body of literature by empirically evaluating the applicability of cognitive content specificity to test anxious and depressive symptoms in a nonclinical population of college women, using measures of positive and negative content and the BSOM ratios. The researcher replicated some of elements of Ingram et al.'s (1987) and Ronan and Kendall's (1997) studies. The current study sought to address the limitations of those studies and existing CCS research in anxiety and depression by using a specific type of anxiety, a large sample of college women, direct measures of positive and negative cognitive products of test anxiety rather than processes, and comparing the results across two content specificity models.

CHAPTER 3

METHODS

3.1 Participants

Participants were college women from the Educational Psychology subject pool at the University of Texas at Austin, which was comprised of students from several undergraduate classes, including Individual Learning Skills, Human Sexuality, Adolescent Development, and Introduction to Statistics. Participant age ranged from 18 to 52 years (M = 21; SD = 2.4). The overall sample was relatively young, with most students being either 20 (23%), 21 (35%), or 22 (19%) years old. Participants 24 years and older accounted for a 4% of the total sample.

Out of a total of 1738 women who completed the packet of measures, 97% (n = 1686) were undergraduates, with over half having senior status (55%, n = 962). The rest of the sample was comprised of juniors (25%, n = 438), sophomores (12%, n = 203), and freshmen (5%, n = 83). Additionally, approximately 3% of all participants had at least a Bachelor's degree. Participants' majors were largely representative of a wide variety of programs at the University of Texas at Austin, including liberal arts, communications, natural sciences, business, education, engineering, nursing, social work, and fine arts. Out of the total sample, 79% (n = 1377) participants had a midterm or final exam within three calendar days before or after data collection.

Participation in the study was voluntary and course credit was given for participation. Upon data collection, the total sample was screened to meet the specified criteria (see section 3.4) and participants were subsequently sorted into groups, comprising the final sample (n = 206).

3.2 Instrumentation

3.2.1 Demographic Measures

The demographic questionnaire asked participants for their age, major, and educational status (freshman, sophomore, junior, senior, or post-baccalaureate/graduate,

including completed Bachelor's, Master's, or Doctoral degrees), based on the number of hours completed, per the University of Texas specifications.

3.2.2 Symptoms Independent Measures

3.2.2.1 Test Anxiety

The participants' test anxiety levels were measured with the Test Anxiety Inventory (TAI; Spielberger et al., 1978; see Appendix A). The TAI is a popular, brief 20-item self-report scale, which describes respondents' reactions before, during, and after exam. It was devised to measure individual differences in test anxiety as a situation-specific personality trait in high school and college students. The instrument captures various cognitive, emotional, physical, and behavioral symptoms of test anxiety. Respondents are asked how they generally feel on a four-point Likert scale, ranging from one ("almost never") to four ("almost always"). The measure yields a total score based on all items and two subscale scores for worry and emotionality. Raw scores are generally converted into standardized T-scores with a mean of 50 and a standard deviation of 10.

Construct validity of the TAI appears to be good. For example, Hedl's (1985) factor analysis supported its trait-state and worry-emotionality distinction. Vispoel (1998) corroborated the utility of using a total score of the TAI by demonstrating that worry and emotionality were moderately correlated (r = .76). There is evidence of convergent validity in that the TAI correlates highly with other widely used test anxiety measures, e.g., it has .69-.83 correlation with the Test Anxiety Scale and .61-.86 correlation with the A-State Scale when given during the testing situations. Further, correlations with five other anxiety measures (ranging from .51 to .82) have also been cited as contributing to establishing the measure's convergent validity (Spielberger et al., 1980). Reliability evidence is adequate: three-week rest reliability is .80, one-month reliability is .81, and internal consistency for the total score is .92-.96 (Spielberger et al.).

3.2.2.2 Depression

The Beck Depression Inventory (BDI; A.T. Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) is arguably the most widely used self-report measure of depression in

adult populations and has been used to screen for various symptoms and features of depression, as well as to assess their severity. The new revision of the BDI, the BDI-II (A.T. Beck, Steer, & Brown, 1996), which was used in the present study, overcomes some psychometric limitations of the original measure and is consistent with the *DSM-IV (2000)* symptoms criteria for depressive disorders. The BDI-II is a brief and easy-to-administer 21-item instrument that is applicable to ages 13 and over. Each item is comprised of several statements varying in severity of the symptom. Those statements were selected due to a lack of association with any particular theory of depression (A.T. Beck, Steer, & Garbin, 1988). Participants are instructed to choose the response that best reflects the way they have been feeling during the last two weeks. Each item requires a response on a 0-3 scale. A single total score is obtained by adding responses to all items and can range from 0 to 63, with higher scores reflecting greater depressive affect.

The BDI-II shows good construct validity, as it adequately discriminates between levels of depression severity (Whisman, Perez, & Ramel, 2000) and patients diagnosed with Major Depressive Disorder have been shown to score significantly higher on the BDI-II than those without diagnosis (Arnau, Meagher, Norris, & Bramson, 2001). Moreover, convergent validity was found to be .93 with the original BDI (Dozois et al., 1998, in a nonclinical college student sample), .68 with the Revised Hamilton Psychiatric Rating Scale for Depression, and .71 with the Beck Hopelessness Scale (A.T. Beck et al., 1996). Most factor analytic studies with the BDI-II (A.T. Beck et al., 1996; Dozois et al., 1998; Steer & Clark, 1997; Storch, Roberti, & Roth, 2004; Whisman et al., 2000) yielded a two-factor model consisting of cognitive-affective and somatic components (initially proposed by A.T. Beck et al., 1996). A few, however, supported a three-factor model (e.g., Al-Musawi, 2001, in a Middle Eastern student sample; Carmody, 2005), and the exact item content of the factors remains unclear (Storch et al., 2004).

In terms of reliability, the BDI-II has shown to have adequate internal consistency for nonclinical college samples, including ethnically diverse ones, with coefficient alpha ranging from .89 to .93 (A.T. Beck et al., 1996; Carmody, 2005; Dozois et al., 1998;

Steer & Clark, 1997; Storch et al., 2004; Wiebe & Penley, 2005) and more specifically for women (coefficient alpha = .91; Dozois et al., 1998). Test-retest reliability ranged from .73 in non-referred students (Wiebe & Penley, 2005) to .96 in referred students (Sprinkle, Lurie, Insko, et al., 2002). Computerized and paper-and-pencil forms of the BDI-II have shown to produce equivalent results (Schulenberg & Yutrzenka, 2001).

3.2.3 Cognitive Dependent Measures

3.2.3.1 Test Anxiety-Relevant Measures of Positive and Negative Cognitions

The subjects' self-statements that occurred during the testing situation were measured with the Checklist of Positive and Negative Thoughts (CPNT; Galassi et al., personal communication, July 25, 2000). This measure of test anxious thoughts was based on many sources, including interviews with test anxious students, theoretical elaborations in the field (e.g., the model of test anxiety developed by Meichenbaum & Butler, 1980), and various popular self-report measures. According to Galassi et al. (1981a), the specific content of the scale deals with "evaluation of the fairness of the test; worrying about performance, possible consequences, and evaluation by others; concentrating and controlling one's reactions to the test; ruminating too long over an answer; and thoughts…of inadequacy" (p. 53). The CPNT consists of 18 positive and 19 negative thoughts and yields two separate scores for the number of positive and negative thoughts checked by each student. The measure has been shown to successfully differentiate between high test anxious and low test anxious individuals (Galassi et al., 1981a). Also, in the study by Arnkoff and Smith (1988), the CPNT negative scale score was related to test anxiety at various points of assessment, adding to the evidence of construct validity. Galassi et al. (1981a) reported internal consistency coefficients of .77 and .79 for the positive and negative thought subscales, respectively. Additionally, concurrent and retrospective measurement with the CPNT did not yield significant differences (Galassi et al., 1981b). The CPNT was originally designed to provide information only about the content the cognitions, whereby participants are instructed to check off the thoughts that occurred to them during tests. In this study, in order to ensure

comparability with other measures, the CPNT scoring was modified to assess the frequency of cognitions on a five-point Likert scale, from one ("never") to five ("very often"). A higher score on the negative subscale and a lower score on the positive subscale were reflective of more test anxious cognitions (Galassi et al., 1981a).

3.2.3.2 Depression-Relevant Measures of Positive and Negative Cognitions

Negative and positive situation-specific cognitions were measured with the Automatic Thoughts Questionnaire (ATQ, hereby referred to as ATQ-N for distinction, as it contains negatively-valenced items; Hollon & Kendall, 1980; see Appendix B) and Positive Automatic Thoughts Questionnaire (ATQ-P; Ingram & Wisnicki, 1988; see Appendix C). Both instruments were developed and validated using groups of depressed and nondepressed participants and were, therefore, considered depression-relevant. They do not necessary reflect a specific cognitive model and have been used to test various theoretical predictions.

The ATQ-N incorporates 30 all-negative statements about the self (e.g., "There's something wrong with me" and "I can't finish anything"). Participants are asked to rate on a five-point Likert scale how frequently each statement has occurred to them during the last week, from one ("not at all") to five ("all the time"). A total score on the ATQ-N is the sum of participants' ratings, with higher scores on the measure reflective of more depressive automatic thoughts. Hollon and Kendall (1980) reported the instrument's good internal consistency (i.e., split-half reliability = .97; coefficient alpha = .96) and adequate convergent validity, as it correlated with the Beck Depression Inventory and the Minnesota Multiphasic Personality Inventory-Depression scale (*r*'s ranged from .45 to .70). Hollon et al. (1986) found that the ATQ-N possessed good specificity and was linked to a syndrome of depression (as measured by the BDI), reflecting depressogenic state-dependent cognitions.

The ATQ-P is the ATQ-N's positive cognition counterpart and measures the frequency of positive self-referent thoughts (e.g., "There's nothing to worry about" and "My future looks bright"). The format is identical to the ATQ-N and includes 30

statements that participants rate on how frequently the specified thought (or a similar one) occurred to them over the past week. The ATQ-P has good reliability characteristics, including coefficient alpha = .95 (Burgess & Haaga, 1994), split-half reliability = .92, test-retest reliability = .80, and stability over time ranging from .91 for one week and averaging .73 over nine weeks (Ingram, Kendall, Siegle, Guarino, & McLaughlin, 1995). Ingram et al. (1995) reported adequate construct validity, as the measure differentiated distressed participants from nondistressed and inversely correlated with the measure of depression BDI (r = - .33 to -.45). The authors also note that the ATQ-P has a relatively low correlation with the ATQ-N (r = .29; Ingram & Wisnicki, 1988), as predicted by theory. They acknowledge problems with the scale's specificity to a particular affective syndrome (the ATQ-P consistently correlates with both the BDI and State-Trait Anxiety Inventory).

3.3. Procedure

Administration of the measures took place over the course of three semesters. Upon being assigned to the study, participants were directed onto the researcher's website. Participants were told that the study was about their feelings, thoughts, and perceptions of academic experiences and everyday situations. To ensure elevated levels of test anxiety, participants were also asked if they had a major examination (i.e., midterm or final) within three calendar days of completing the measures. A major examination was defined as one that accounted for at least 25% of the course total grade. Participants completed the measures at their convenience. The items on cognitive measures were randomly combined for each disorder (per Ingram & Wisnicki, 1988). All items were computer-administered online in a single session, using an individual format. It was estimated that it took the subjects approximately one hour on average to complete the study. All participants were instructed to read and accept the electronic consent form. Subjects who did not sign the consent form were not eligible for participation. Upon completion, the participants were presented with a debriefing page, which explained the purpose of the study.

3.4 Group Selection

Sample size was determined using Laüter's (1978) table for k-group MANOVA power analysis (cited in Stevens, 1996). For a 4-group MANOVA and a power of .70, assuming a moderate to large effect size of d = .75 to 1.00, a sample size of 36-62 per group was needed. In order to qualify for the final sample, the participants had to have a midterm within three days of completing the measures and meet the specified cutoffs on the depression and test anxiety measures.

The last quartile on the TAI was used as a cutoff point determining elevated test anxiety, whereas the first quartile was a set point for the absence of test anxiety (e.g., see Thyer & Papsdorf, 1982). For the BDI-II, A.T. Beck et al. (1996) suggested cutoffs for student populations: 0-13, *asymptomatic*; 14-19, *mildly depressed*; 20-28, *moderately depressed*; and 29-63, *severely depressed*. Similarly, Dozois et al.'s (1998) study yielded empirically supported cutoffs for the student populations as follows: 0-12, *nondepressed*; 13-19, *dysphoric*; and 20-63, *depressed*. In the current study, the item addressing suicidal ideation was removed from the BDI-II for ethical purposes, as it is was not feasible for the study administrator to provide assistance to those in need. The prorated BDI-II cutoffs were as follows: at or above 19, *elevated depression*; at or below 11, *low depression*.

Those who scored in the last quartile on the TAI and at or below 11 on the BDI-II were classified as *test anxious-only*. Ideally, those who scored above 19 on the BDI but in the first quartile on the TAI would be considered depressed-only. As it was difficult to obtain an adequate number of subjects with elevated depression but with low test anxiety (see Sanz & Avia, 1994, for a similar problem), ultimately the participants with elevated depression and scores on the TAI below 50th %-ile were selected for this group. The rest of the groups were matched as much as possible with the depressed group on age, educational status, major, and the time of test completion. Those who scored above the cutoffs on both the TAI and the BDI-II met the study's criteria for the comorbid group, whereas those who scored below the designated cutoff scores constituted the control group.

After the screening, the sample contained 58 subjects with elevated depression, 110 subjects with elevated test anxiety, 144 subjects with comorbid test anxiety and depression, and 326 controls. The following four groups of participants were formed from the that sample: (1) 51 with elevated test anxiety and non-elevated depression (hereby referred to as *"purely" test-anxious*), (2) 51 with elevated depression and non-elevated test anxiety (hereby referred to as *"purely" depressed*), (3) 52 with elevated levels of both test anxiety and depression (hereby referred to as *"mixed"* group), and (4) 52 with non-elevated levels of test anxiety and depression (hereby referred to as *control* group). Participants in four groups were, on average, 21 years old. Most participants were seniors (53-60% of each group), followed by juniors (29-31% of each group) and sophomores (12-16% of each group). Thus, the final sample was representative of the total pre-selection sample.

3.5 Ethical Considerations

This study complied with the ethical standards of research required by the American Psychological Association and the University of Texas at Austin. Prior to conducting the study, the research proposal was submitted and approved by the Institutional Review Board of the University of Texas at Austin and the departmental review committee of the Educational Psychology department. All participants were informed of their right to complete or not to complete the study and indicated their consent electronically. They had the right to refuse participation, terminate the testing session, or not complete the measures; alternate course assignment was provided for those students. Online answers were confidential: participants were automatically assigned a random unique number once they completed the measures**.** Names of the participants did not appear on any of the materials in the study. There was a slight possibility that by participating in the study, the subjects would become increasingly aware of the emotional states of test anxiety and depression and, therefore, might become vulnerable. Thus, upon completion, they were provided with the web links and phone

numbers to the University Counseling and Mental Health Center where they could access treatment and look up information on test anxiety and depression.

3.6 Experimental Design, Hypotheses, and Expected Results

3.6.1 Experimental Design

This study used a multivariate design with four independent groups to test for cognitive content specificity. This type of design has been used in previous CCS research (e.g., D.A. Clark, Beck, & Stewart, 1990; Laurent & Stark, 1993).

3.6.2 Hypotheses

Due to this study's focus on evaluating the differences between "purely" depressed, "purely" test anxious, "mixed" participants, and controls on several continuous dependent variables, comparisons were based on a one-way four-group multivariate analysis of variance (MANOVA). A one-way analysis, recommended by Ingram (1989a) and Kendall and Ingram (1989), allowed for "comparison of differences between a control group and the three dysfunctional groups, as well as for differences among three dysfunctional groups" (Bruch et al., 1993, p. 10). Further, MANOVA helped control the Type I error rate and allowed the researcher to account for the correlation between the measures (Stevens, 1996).

The following hypotheses regarding cognitive content specificity in depression and test anxiety were explored in this study:

3.6.2.1 Hypothesis 1 – CCS Model.

It was expected that, based on a four-group ("purely" depressed, "purely" test-anxious, "mixed", and control) MANOVA, there would be significant mean differences between the four groups on a linear composite of the self-reported cognitions. Specifically, "purely" test anxious individuals would manifest overall different patterns of cognitions from those of "purely" depressed, "mixed", and control individuals, such that the four groups would obtain different scores on the four cognitive measures,

including the ATQ-N, the ATQ-P, and the CPNT (positive and negative scales; frequency rating modification).

Rationale.

According to the cognitive specificity approach (A.T. Beck, 1976; Ingram & Kendall, 1987; Kendall & Ingram, 1989), the content of automatic cognitions would allow one to differentiate between anxiety and depression. Additionally, researchers have proposed that both positive and negative cognitive content are important for anxiety and depression (Jolly & Kramer, 1994). Depression has been uniquely characterized by the presence of negative self-focus and decreased positive thinking manifested across situations (D. A. Clark et al., 1999). Compared to those of depressed individuals, cognitions of highly test-anxious individuals are tied to specific evaluative situations and intrude upon them while performing evaluation tasks (I.G. Sarason et al., 1986). Their cognitive content has also been described as negative and relates to evaluations of self, task performance, and how others view them, while positive thoughts are few (Galassi et al. 1981a, 1981b; Sarason et al., 1986).

Empirical evidence has supported the assertion that depression and anxiety conditions can be successfully differentiated based on their respective cognitive content. More specifically, social anxiety studies with college students indicated the presence of group differences (Bruch et al., 1993; Ingram, 1989b; Sanz & Avia, 1994) and a close association between automatic thoughts and subclinical expression of depression and anxiety (e.g., Calvete et al., 2005a; Cho & Telch, 2005). Further, CCS studies of depression and test anxiety (Ingram et al., 1987; Sanz & Avia, 1994), however few, corroborate group differentiation, especially on depression-relevant measures.

Although the CCS hypothesis (A.T. Beck, 1976) does not make explicit predictions regarding comorbid condition, Beck's cognitive theory explains that the presence of both emotional states in an individual is likely to result in the manifestation of both depression- and anxiety-related cognitive processing biases, as they stem from two different dysfunctional schemas. The presence of a dual bias is likely to lead to more

psychopathology than a single dominant bias in "pure" conditions. Thus, the comorbid group was expected to show an overall higher level of maladjustment than "purely" depressed and "purely" test anxious groups or controls. Several specificity studies with college students supported the notion of comorbidity being different from the anxiety-only and depression-only conditions (e.g., Bruch et al., 2003; Ingram et al., 1987; Sanz & Avia, 1994), although the evidence was stronger for negative content.

In contrast, controls do not typically demonstrate significant dysfunctional thinking even in the face of a stressful stimulus, such as a testing situation, because hypothetically speaking, they do not have dysfunctional schemas or their schemas are not activated as easily by specific stressful events (A.T. Beck, 1976). Several empirical studies indicated that control group engaged in the least overall maladaptive thinking compared to other groups with psychopathology (Bruch et al., 2003; Ingram et al., 1987).

Provided *Hypothesis 1* was supported, *subhypotheses 1a)* through *1d)* would be generated. The expected directional differences for the subhypotheses are presented in Table 2 below. A contrast was considered *primary* if it provided a test of the cognitive content specificity hypothesis. A contrast was considered *exploratory* if directional differences could not be predicted by the model.

Table 2

Expected Directional Means for Cognitive Measures

	Contrasts for the Groups					
1a) ATQ-N	D > TA	TAD > TA	D ? TAD	TA ? C	D > C	TAD > C
1b) ATQ-P	D < TA	TAD < TA	D ? TAD	TA ? C	D < C	TAD < C
1c) CPNT-N	D < TA	TAD ? TA	D < TAD	TA > C	D ? C	TAD > C
1d) CPNT-P	D >TA	TAD ? TA	D > TAD	TA < C	D ? C	TAD < C

Note. TA – "purely" test anxious group; D – "purely" depressed group; TAD – "mixed" test anxious-depressed group; and C – control group. Relationships marked with a "?" are exploratory.

Subhypothesis 1a) – Depression-Relevant Negative Cognitions.

"Purely" depressed participants would have significantly higher scores on the Automatic Thoughts Questionnaire (ATQ-N) than "purely" test anxious participants and controls. Additionally, "mixed" participants would have significantly higher scores on the same measure than "purely" test anxious participants and controls.

Rationale. The negativity hypothesis (A.T. Beck, 1976), which is an integral part of Beck's model, posits that a depressive state is uniquely characterized by the increased negative self-referent cognitions (D. A. Clark et al., 1999). This negativity is due to the activation of the schemas of loss and is considered pervasive. There appears to be considerable empirical support for this hypothesis (see D.A. Clark & Steer, 1996, for a review). A rivaling tripartite model (L.A. Clark & Watson, 1991) asserts that anxiety and depression share a common factor of negative affect or general psychopathology, which would support a lack of differences between the depressed and test anxious groups on depressive negative content. Thus, a task of differentiating depression-specific negative content becomes particularly relevant when comparing depression with anxiety disorders.

Specificity studies looking into negative automatic cognition in college students confirm that when compared to those with anxious symptomatology (including social anxiety and test anxiety) and those without significant symptoms of psychopathology, individuals with depressive symptoms tend to have more negative thoughts on the instruments theoretically associated with depression (e.g., Bruch et al., 2003; Ingram, 1989b; Ingram et al., 1987) and negative cognitions are uniquely associated with depression (Cho & Telch, 2005).

According to Beck's model (A.T., Beck, 1976), due to the presence of depressogenic schema (hypothesized to be predominantly negative), those with comorbid expression of depression and anxiety were expected to show more negative cognitions on

depression measures than either anxiety-only individuals or those relatively free of any psychopathology, who are both hypothesized to not have a depressogenic schema. Several empirical studies with college students confirmed that comorbid group indeed tended to score higher than anxious or control groups on the measures of depressive negative cognitions (e.g., Bruch et al., 2003; Ingram, 1989b).

Subhypothesis 1b) – Depression-Relevant Positive Cognitions.

"Purely" depressed participants would have significantly lower scores on the Positive Automatic Thoughts Questionnaire (ATQ-P) than "purely" test anxious participants and controls. Additionally, "mixed" participants would have significant lower scores on the same measure than "purely" test anxious participants and controls.

Rationale. Some researchers have argued that the notion of positivity in automatic thinking may be a useful variable when comparing depression and specific anxieties (Burgess & Haaga, 1994). According to Beck's exclusivity hypothesis (A.T. Beck, 1976) and the tripartite model (L. A. Clark & Watson, 1991), decreased positivity in cognition and affect is a unique characteristic of depression (D. A. Clark et al., 1999). Therefore, depressed individuals would be expected to have less positive cognitions than either anxious individuals or controls. Although empirical evidence for this proposition is somewhat equivocal, there is a body of literature using mostly depression-relevant instruments with clinical populations that supports it (for review, see D. A. Clark et al., 1999). Several cognitive specificity studies with college students (Bruch et al., 2003; Ingram, 1989b) have demonstrated that, contrary to predictions, depressed group scored the same as anxiety group on the measure of positive cognitions despite having lower scores than controls.

For those with comorbid anxiety and depression Beck's theory (A.T. Beck, 1976) would predict lower scores on depression-specific positive thinking instruments than for anxiety-only individuals and controls (consistent with more dysfunctional profile), due to the presence of depressogenic cognitive structures. Empirical research, however, has been anything but unequivocal. Some studies reported comorbid group's highly

dysfunctional profile, with the lowest scores of all groups (Bruch et al., 2003), while others found this group to score lower than controls but equivalent to other groups (Ingram, 1989b). Still there were a few that obtained no differences at all (McKellar et al., 1996).

Subhhypothesis 1c) – Test Anxiety-Relevant Negative Cognitions.

"Purely" test anxious participants would have significantly higher scores on the negative subscale of the Checklist of Positive and Negative Thoughts (CPNT-N) than "purely" depressed participants and controls. Additionally, "mixed" participants would have significant higher scores on the same measure than "purely" depressed participants and controls.

Rationale. According to the tripartite model (L.A. Clark & Watson, 1991) and its cognitive-affective reformulations (e.g., Mineka et al., 1998), negativity in affect and cognitive content is common to both depression and anxiety group disorders, especially social anxiety. This assertion supports a lack of differences between the depressed and test anxious groups on anxious negative content. The uniqueness of negative content in anxiety compared to depression has not been established in theory, although the CCS model would not contradict the anxiety-depression group distinction.

There have been only a few specificity studies that compared both test anxiety and depression on their cognitions (i.e., Ingram et al., 1987; Sanz & Avia, 1994, study1), but the measure used in those studies did not contain valenced content. Thus, although the results are supportive, their generalization is limited. In light of scarcity of test anxiety CCS research, studies with college students that looked at specificity of negative cognitions associated with particular anxiety versus depression, as well as clinical literature, deserve attention. A handful of clinical studies supported specificity of negative anxious content (e.g., A.T. Beck et al., 1987; Clark et al., 1989). The results of Bruch et al.'s (1993) and Sanz and Avia's (1994) studies indicated that the socially anxious group was not significantly different from the depressed group but higher than control group on the measure of social anxiety-relevant negative cognitions. Additionally,

non-CCS research in test anxiety has indicated that, similar to depression, its levels were directly related to the frequency of negative automatic thoughts (e.g., Arnkoff & Smith, 1988; Blankstein et al., 1991; Galassi et al., 1981a, 1981b; King et al., 1995). Due to a lack of solid empirical validation for the CCS prediction, the current study used a measure of negative cognitions specific to test anxiety (i.e., CPNT-Negative Scale) in order to maximize the chances of finding specificity.

Based on the implications from Beck's model (A.T. Beck, 1976), those with the comorbid condition were expected to have higher scores on the measure of depressive negative cognitions than those with depression-only and controls, due to the presence of a dysfunctional anxious schema in addition to the depressogenic one. Empirical research with college students has provided some evidence in favor of this statement (Bruch et al., 2003, study 1; Sanz & Avia, 1994, studies 1 and 2) in social anxiety. In two out of three studies above, comorbid group scored higher than all other groups, including social anxiety group.

Subhypothesis 1d) – Test Anxiety-Relevant Positive Cognitions.

"Purely" test anxious participants would have significantly lower scores on the positive subscale of the Checklist of Positive and Negative Thoughts (CPNT-P) than "purely" depressed participants and controls. Additionally, "mixed" participants would have significantly lower scores on the same measure than "purely" depressed participants and controls.

Rationale. The tripartite model (L.A. Clark & Watson, 1991) does not yield predictions regarding low positive thinking in anxiety, although theorists note that low positivity is seen in both anxiety and depression (Watson, 2005). The CCS hypothesis (A.T. Beck, 1976) proposes that there would be differences between anxious and depressed groups on the content measures. Therefore, in the absence of concrete predictions, positive content specificity of anxiety does not contradict this model's premises. CCS research on comparing test anxiety and depression on the frequency of positive automatic thoughts has been nonexistent. Further, as with positive statements

that are depression-relevant, empirical support for specificity of social anxiety-relevant positive cognitions has been ambiguous and scanty. In the studies comparing social anxiety and depression, it was found that (1) anxiety group was lower than depressed or control group (e.g., Bruch et al., 2003, study 1) or (2) there were no differences between the "pure" groups and between "pure" groups and controls (Sanz & Avia, 1994, studies 1 and 2). Non-CCS literature has shown that test anxiety (Blankstein et al., 1991; Blankstein & Flett, 1990; Galassi, 1981a, b) and social phobia (Beidel, Turner, & Dancu, 1985) are characterized by less frequent positive thoughts.

As stated elsewhere in this manuscript, the "mixed" group would be expected to have two maladaptive schemas and, therefore, significantly less positive anxiety thoughts when compared to those with depression-only and without considerable psychopathology (A.T. Beck, 1976). Similar to the area of the negative content, the empirical evidence for test anxiety specificity is missing. Further, the CCS research in social phobia has generated mixed results. The study by Sanz and Avia (1994, study 1) produced no differences in positive social anxiety-relevant positive cognitions between comorbid group and all other groups. In contrast, in Bruch et al.'s (2003) study, comorbid group had the lowest frequency of positive cognitions), compared to all other groups.

3.6.2.2 Hypothesis 2 – CCS/BSOM Model

Hypothesis 2 tested for specificity of cognitive content in the form of cognitive ratios. These ratios are hereafter referred to as the *BSOM ratio*s for distinction, to denote that the predictions are based on the reformulated Balanced State of Mind model (Schwartz, 1997) rather than the original SOM model (Schwartz & Garamoni, 1989). The Balanced States of Mind ratios relevant to depression are referred to as the *BSOM-D*, whereas the ratios for test anxiety are referred to as the *BSOM-TA*. Prior to addressing relationships involving cognitive ratios, the methodology of their calculation must be discussed.

BSOM Ratio Calculation.

To calculate the BSOM-D ratio for each participant, the total score on the ATQ-P (i.e., positive cognitions relevant to depression) was first divided by the sum of total scores for the ATQ-P and ATQ-N (negative and positive cognitions relevant to depression), i.e., BSOM-D = ATQ-P / (ATQ-P + ATQ-N). Similarly, the BSOM-TA equaled the score on the CPNT-Positive Scale (positive cognitions relevant to test anxiety) divided by the sum of both scales of the CPNT (positive and negative cognitions relevant to test anxiety), i.e., BSOM-TA = CPNT-P / CPNT. Thus, the ratios were derived from content-specific positive and negative cognitions but were not their linear transformations.

Next, the BSOM ratios for each group had to be revised. First, following the example of McDermut and Haaga (1994), the BSOM-TA ratios were adjusted for an unequal number of items on the CPNT positive and negative scales. To accomplish this, each score for BSOM-TA was multiplied by 1.056 (19/18). Thus, the formula became: BSOM-TA = CPNT-P * 1.056 / ((CPNT-P * 1.056) + CPNT-N). Second, in theory, the BSOM ratios range from 0.0 to 1.0 (Schwartz, 1997). However, there is range restriction due to the self-statement measures being scored on a five-point Likert-type scale. Thus, for a 30-item measure, such as the ATQ-N or ATQ-P, the ratio would range from .167 to .833, i.e., from the lowest 30 / (30+150) to the highest 150 / (150+30) (Schwartz & Garamoni, 1989). This can be corrected by simple constant subtraction, recommended by Amsel and Fichten (1990). Thus, a constant of 30 was subtracted from each subject's ATQ-N and ATQ-P scores, while a constant of 19 was subtracted from each participant's CPNT-N and CPNT-P (adjusted for item count) scores. This allowed to shift downward by one point (from 1 = "hardly ever" through 5 = "almost always" to 0 = "hardly ever" through 4 = "almost always"). Thus, the modified formula became: BSOM-D = (ATQ-P - 30) / ((ATQ-P + ATQ-N) – 60); BSOM-TA = ((CPNT-P * 1.056) -19) / (((CPNT-P * 1.056) + CPNT-N) -38). While the two adjustments above (i.e., multiplication by a constant or subtracting a constant) did not affect group differences, they did impact the actual BSOM intervals, as even a small variation in the BSOM ratio calculation leads to

changes in the number of subjects falling within each interval category. Thus, the issue of the BSOM adjustment was only applicable to *Hypothesis 3*.

Hypothesis.

It was expected that, based on a four-group ("purely" depressed, "purely" test-anxious, "mixed" depressed-test anxious, and control) MANOVA, there would be significant mean differences between the four groups on a linear composite of the BSOM ratios derived from self-reported cognitions relevant to test anxiety and depression. Specifically, "purely" test anxious individuals would manifest overall different patterns of cognitions from those of "purely" depressed, "mixed" depressed-test anxious, and control individuals, such that the four groups would obtain different scores on the dependent variables, including the BSOM-D and BSOM-TA ratios.

Rationale. According to both the original SOM (Schwartz & Garamoni, 1989) and reformulated BSOM model (Schwartz, 1997), psychopathological conditions, such as test anxiety and depression, are characterized by low relative shares of positive cognitions in the sum of positive and negative cognitions, as compared to conditions without negative affective components. Furthermore, based on the CCS hypothesis (A.T. Beck, 1976) and cognitive conceptualization of depression and test anxiety in Beck's model (A.T. Beck, 1976; A.T. Beck, Emery, & Greenberg, 1996), both depressed and test anxious individuals should have unique profiles that are characteristic of their respective schemas, i.e., of loss (with resulting pessimism about the self, the world, and the future) and evaluative threat (with resulting worry about task performance and about how they will be judged by others). Further, comorbidity was expected to engender the most dysfunctional profile.

The literature has long pointed to the need of using integrative approaches to CCS, in order to achieve better cognitive differentiation of anxiety and depression (e.g., Haaga, Dyck, & Ernst, 1991; Kendall, Howard, & Hays, 1989; McDermut & Haaga, 1994; Schwartz & Garamoni, 1989). As a more general model of psychopathology, the BSOM model can potentially augment the CCS model by offering (1) more specific

predictions regarding group differences (i.e., BSOM-D ratios in test anxious individuals versus controls and the BSOM-TA ratios in depressed participants versus controls) and (2) a more parsimonious solution to the dilemma of anxiety-depression differentiation in that more information is combined in a single ratios to achieve specificity. In such integrative view, the BSOM ratios are postulated to be unique to test anxiety and depression.

Studies of the integrated CCS/SOM model in adults (Calvete and Connor-Smith, 2005; Calvete et al., 2005; McDermut & Haaga, 1994) are scanty and yield inconsistent results. In their correlational analysis, McDermut and Haaga's (1994) found evidence in favor of SOM-D specificity to depression, while evidence for the anxiety content was less convincing. Due to the overall paucity of research in the area, several studies of children were considered, although their findings cannot be easily generalized to college students. These studies (e.g., Ronan & Kendall, 1997) offered some evidence of group differences. Research by McKellar et al. (1996) and Ronan and Kendall (1997) also supported the dysfunctional content of comorbid group and adaptive nature of the BSOM ratios in controls. Schwartz and Garamoni (1989) also reported consistent empirical support for the distinction based on the SOM ratios in those with psychopathology and without it for various disorders in the non-CCS studies.

Provided *Hypothesis 2* was supported, *Subhypotheses 2a)* and *2b)* would be generated. Expected differences on the specific dependent measures are presented in Table 3 below. Lower BSOM ratios reflect more psychopathology. A relationship was considered *primary* if it provided a test of the CCS hypothesis alone or of the joint CCS/BSOM model. A relationship was considered *secondary* if it did not test the CCS predictions. A contrast was considered *exploratory* if directional differences could not be predicted by a specific model.

Table 3

Expected Directional Means for the BSOM Ratios

	Contrasts for the Groups					
2a) BSOM-D	D < TA	TAD < TA	*D > TAD*	TA ? C	D < C	TAD < C
2b) BSOM-TA	D > TA	*TAD < TA*	D > TAD	TA < C	D ? C	TAD < C

Note. Italics type denotes secondary contrasts; "?" mark denotes exploratory contrasts.

Subhypothesis 2a) – BSOM-D Ratios.

"Purely" depressed participants would have significantly lower mean BSOM-D ratios than "purely" test anxious individuals and controls. Additionally, "mixed" participants would have significantly lower mean BSOM-D ratios than "purely" depressed participants and controls, while "purely" test anxious participants would have significantly lower BSOM-D ratios than controls.

Subhypothesis 2b) – BSOM-TA Ratios.

"Purely" test anxious participants would have significantly lower mean BSOM-TA ratios than "purely" depressed and control individuals. Additionally, "mixed" participants would have significantly lower mean BSOM-TA ratios than "purely" test anxious participants and controls, while "purely" depressed participants would have significantly lower BSOM-TA ratios than controls.

Rationale. The prediction that the anxiety and depression groups would differ on their disorder-relevant BSOM ratios could be explained only by the CCS hypothesis, while the rest of primary predictions were based on the postulates derived from both the CCS and the BSOM models. In regards to depressive content (*Subhypothesis 2a*), McDermut and Haaga (1994) found specificity of the SOM-D ratios using multiple regression analysis in that those ratios accounted for a higher proportion of unique variance in depressive symptoms than did the SOM-SA ratios. In a study by McKellar et

al. (1996), the SOM-D ratios of the depression group were significantly different than those of the anxiety group, but the differences were small. The depression-anxiety group differences were also found in children (Ronan & Kendall, 1997). In contrast, in a study on PTSD by Nasby and Russell (1997), the SOM-D ratios differentiated PTSD group from controls. In regards to anxious content (*Subhypothesis 2b*), McKellar et al.'s study provided little evidence of specificity of anxiety-relevant ratios to anxiety symptoms. After conducting secondary analyses, researchers concluded that such lack of specificity might have been due to the lack of specificity of positive thoughts to anxiety rather than methodological limitations. Similarly, Ronan and Kendall (1997) did not find group differences.

Depressed individuals' BSOM ratios were expected to be lower than those of controls. Although researchers investigated the SOM ratios for various anxiety disorders (e.g., Arnkoff et al., 1992; Bruch et al., 1991; Glass & Furlong, 1990; Heimberg et al., 1990; Michelson et al., 1992; Nasby & Rusell, 1997; Schwartz & Michelson, 1987; and Topman et al., 1992) and depression (e.g., Garamoni et al., 1991; Schwartz et al., 2002) separately, research using simultaneous assessment of the BSOM ratios in anxiety and depression has been insufficient. A few of such studies indicated significant group differences (McKellar et al., 1996; Ronan & Kendall, 1997).

Both the CCS and BSOM models predicted that individuals with comorbid depression and anxiety would have more dysfunctional (lower) ratios than that of either individuals with depression only or individuals with anxiety only. Additionally, comorbid group would have more maladaptive anxiety-relevant ratios, compared to the depression group, and more maladaptive depression-relevant ratios, compared to the test anxiety group. Preliminary evidence for the anxiety-depression differences on depressive content was found by McKellar et al. (1996) in college students and by Ronan and Kendall (1997) in children.

Secondary predictions of both subhypotheses were based solely on the SOM and BSOM model's contentions (Schwartz, 1997; Schwartz & Garamoni, 1989) that the more

pathological conditions would produce lower SOM ratios. For depressive content, the predictions are supported by McKellar et al. (1996) but not by Ronan and Kendall (1997). In contrast, the latter researchers did find support for the BSOM's predictions on the anxiety content.

3.6.2.3 Hypothesis 3 – BSOM Parameters Applied to the CCS Model

Hypothesis 3 predicated that all four groups would produce mean BSOM ratios for test anxiety and depression (i.e., BSOM-TA and BSOM-D, respectively) that would fall within the parameters specified by the BSOM model. Predicted intervals for each of the two disorder-specific mean BSOM ratios are reported in Table 4 below. For a review of the BSOM interval categories, see Table 1, section *2.7.2.1.*

Table 4

Predicted BSOM Categories for Disorder-Relevant Group Means

	Groups			
	TA	D	TAD	C
BSOM-TA	CD	?	FCD	PD
BSOM-D	?	CD	FCD	PD

Note. FCD – Failed Coping Dialogue; CD – Conflicted Dialogue; SCD – Successful Coping Dialogue; PD – Positive Dialogue. Interval categories with a "?" mark are exploratory.

Rationale.

The BSOM ratios can serve as valuable indicators of the level of stress and coping for each group. In the BSOM model (Schwartz, 1997), the Conflicted Dialogue (CD) is typically linked to the mild forms of psychopathology. College students with *"pure" conditions* are more likely, on the average, to demonstrate the BSOM ratios related to prodromal conditions, i.e., in the CD range. Thus, the mean BSOM-TA ratio for those with "pure" test anxiety and the mean BSOM-D ratio for those with "pure" depression were expected to mostly fall within the CD interval. Studies by McKellar et al. (1996)

and Ronan and Kendall (1997) with sorted samples supported these predictions, whereas unsorted samples of college students yielded higher estimates in the Successful Coping Dialogue range (e.g., McDermut & Haaga, 1994).

Comorbid conditions are typically associated with more pathology than "pure" conditions. Furthermore, for the current study, given that (1) college student demonstrate less severe psychopathology than clinical subjects; (2) for most subjects, the data collection took place during midterms, which are lower stakes tests than finals and (3) assessment had a retrospective recall nature, the students' BSOM ratios were not expected to reflect severe psychopathology, despite stressful test conditions that they were either about to undergo or had recently experienced. Thus, their average group ratios were likely to be beyond the range of significant psychopathology, i.e., higher than Negative Monologue or Negative Dialogue. Overall, it was estimated that both mean BSOM ratios would fall within the interval of Failed Coping Dialogue (also see Ronan & Kendall, 1997), which has been associated with more moderate forms of psychopathology (Schwartz, 1997).

In contrast, those with *low* levels of *pathology* or absence of stress were expected to exhibit symptoms consistent with adaptive coping, ranging from about .70 to .85 (Positive Dialogue category; Schwartz, 1997). Data from sorted groups indicated that adult control group had a ratio slightly lower than predicted (SCD range), whereas children (Ronan & Kendall, 1997) had ratios similar to the ones predicted by the theory.

CHAPTER 4

RESULTS

Data analyses for this study included both descriptive and inferential statistics in preliminary and major analyses.

4.1 Preliminary Analyses and Statistics

Intercorrelations among the variables are presented in Table 5.

Table 5

Intercorrelations for All Variables

	Variables	2	3	4	5	6	7	8
1	BDI-II	.23	.65	-.59	.36	-.37	-.72	-.42
2	TAI		.31	-.06	.71	-.43	-.25	-.66
3	ATQ-N			-.52	.54	-.37	-.92	-.51
4	ATQ-P				-.23	.53	.76	.41
5	CPNT-N					-.59	-.48	-.90
6	CPNT-P						.49	.85
7	BSOM-D							.56
8	BSOM-TA							–

Note. Correlations of $r(204) = .14$ are significant at $p < .05$; correlations of $r(204) = .18$ are significant at $p < .01$; correlations of $r(204) = .23$ are significant at $p < .001$.

Similar to the CCS research of social anxiety (e.g., Bruch et al., 1993; Ingram, 1989a), the test anxiety and depression symptom measures were significantly but weakly correlated [$r(204) = .23$, $p < .001$], adding to the evidence of lower affective confounding between specific types of anxiety and subclinical depression. The moderate correlations between the cognitive self-statement measures of test anxious and depressive negative

content (r = .54) and positive content (r = .53) suggest adequate disorder specificity contained within the measures. Moderate negative correlations between negative and positive content for both test anxiety (r = -.59) and depression (r = -.52) are consistent with the idea that positive and negative thoughts may be related but are not a part of the same continuum (i.e., are orthogonal, as suggested by Watson & Tellegen, 1985, for affect). Some of the strongest correlations were between the symptomatic measures of test anxiety and depression and cognitive measures of negative cognitions (r = .71 and .65, respectively), suggesting a close link between the two. In contrast, the cognitive measures of positive cognitions yielded weaker correlations with the symptoms measures (r = -.59 for depression and -.43 for test anxiety). The BSOM-D ratios showed a moderate but highly significant inverse correlation with the symptoms of depression (r = -.72). Similarly, the BSOM-TA showed a moderate correlation of -.66 with the symptoms of test anxiety.

Since this was the first administration of the frequency version of the CPNT, the measures of validity and reliability for the total sample were calculated for that measure. The internal consistency of both scales of the CPNT was very good (Cronbach's alpha = 0.96 and 0.95 for the negative and positive scales, respectively). The CPNT-N correlated moderately with the TAI (r = .78), providing evidence for adequate convergent validity, while the CPNT-P yielded a much lower correlation with the TAI (r = -.48).

Preliminary analyses including one-way four-group ANOVA and chi-square tests were conducted on the interval and categorical variables, respectively, to determine whether groups were comparable on their demographic characteristics (i.e., age and educational status) and time of test in relation to measure completion (i.e., 'before', 'after', and 'before and after'). A univariate F-test (one-way, four-group) used to compare the mean ages yielded no significant differences in age, F (3, 202) = 0.46, p = 0.71. Also, a Chi Square test of proportions was used to check if the groups had equal representation in terms of their educational status. These frequencies were not significantly different, $\chi^2(15, n = 206) = 9.89$, p = .083. The same test was used to test for

equal representation of those with the different time of measure completion. Similarly, the frequencies were not statistically significant for either those who had a major test prior to measure completion, $\chi^2(3, n = 206) = 3.99$, $p = .26$; after, $\chi^2(3, n = 206) = 2.64$, $p = .45$; or both, $\chi^2(3, n = 206) = 1.00$, $p = .80$. Additionally, when participants had an important exam had no bearing on the levels of test anxiety, as signified by a one-way ANOVA, $F(2, 203) = 1.48$, $p = 0.23$.

Following the suggestion by Ingram (1990a) that was also implemented by Sanz and Avia (1994), group differences on selection measures were analyzed to determine if using cutoffs for group selection leads to confounding problems, such as "purely" test anxious group and control groups having significantly higher BDI-II scores than "purely" depressed and "mixed" group, or the latter groups having higher TAI scores than those with test anxiety or controls. One-way four-group MANOVA was conducted on the BDI-II and TAI scores with group classification as an independent variable. As expected, the results were significant, Wilks' lambda = .02; F (6, 402) = 395.17, $p < .001$. From the MANOVA, two one-way ANOVAs also showed significance for depression, F (3, 202) = 335.19, $p < .001$ and test anxiety, F (3, 202) = 493.09, $p < .001$. The Newman-Keuls tests revealed that that the "mixed" and depressed group were equivalent on the BDI-II and were significantly higher than for the other two groups. On the TAI, the mixed group had the highest scores of all three groups, including test anxious group, and both groups scored considerably higher than depressed or control groups. Thus, the differences were in the expected direction. Descriptive statistics for the independent variable measures are presented in Table 6.

Table 6

Mean Scores and Standard Deviations for Symptoms Measures

	Groups			
	TA (n = 51)	D (n = 51)	TAD (n = 52)	C (n = 52)
BDI-II	6.51 (3.74)	25.53 (6.23)	27.23 (6.04)	3.23 (2.67)
TAI	72.55 (6.68)	38.31 (8.54)	75.94 (9.19)	31.69 (4.11)

4.2 Main Analyses and Statistics

Results for *Hypotheses 1* through *3* are reported below. Data analyses were conducted using the NCSS statistical and power analysis software (NCSS, 1995).

4.2.1 Analyses of Hypothesis 1

Hypothesis 1 predicted that college women with elevated test anxiety would have significantly different scores from those with elevated depression and those with either high or low levels of both test anxiety and depression on the linear composite of measures of depression- and test anxiety-relevant negative and positive cognitions. Frequency responses were summed up in order to calculate each scale's total score on the ATQ-N, ATQ-P, and CPNT (both scales).

4.2.1.1 Descriptive Statistics

Descriptive statistics on the self-report continuous dependent variables are reported in Table 7.

Table 7

Mean Scores and Standard Deviations for Dependent Measures

	Groups			
	TA (n = 51)	D (n = 51)	TAD (n = 52)	C (n = 52)
Depression				
ATQ-N	48.61 (15.45)	71.82 (21.21)	87.15 (23.11)	35.60 (5.13)
ATQ-P	112.18 (17.93)	80.63 (18.34)	86.92 (16.25)	115.54 (19.73)
Test Anxiety				
CPNT-N	54.29 (9.65)	39.71 (11.35)	65.38 (13.52)	28.54 (6.72)
CPNT-P	48.51(10.13)	49.65 (15.59)	40.33 (10.36)	62.33 (13.40)

4.2.1.2 Inferential Statistics

In order to test *Hypothesis 1*, a one-way four-group (purely depressed, purely test anxious, mixed depressed and test anxious, and control) MANOVA was performed with four dependent variables, i.e., negative and positive depressive cognitions, and negative and positive test anxious cognitions. As expected, the MANOVA revealed significant effects of psychopathology on self-reported cognitions of depression and test anxiety that were reflected in group differences, Wilks' lambda = .15; F (12, 527) = 45.34, $p < .001$.

Analyses of Hypotheses 1a) through 1d).

From *Hypothesis 1*, directional differences in the group scores were further predicted based on the CCS hypothesis. Specifically, *Subhypotheses 1a)* and *1b)* predicted that on depression-relevant measures of differently-valenced cognitions, "purely" depressed participants would have higher scores on negative cognitions and lower scores on positive cognitions than either their test anxious counterparts or controls. Further, for *Subhypotheses 1c)* and *1d)*, it was predicted that on test anxiety-relevant

measures of differently-valenced cognitions, "purely" test anxious participants would have higher scores on negative cognitions and lower scores on positive cognitions than either depressed participants or controls.

Inferential Statistics. Given that the MANOVA results were significant, the follow-up one-way four-group ANOVA F-tests were conducted to test for the differences between the groups on the ATQ-N, ATQ-P, and both subscales of the CPNT. One-way ANOVAs yielded significant group differences on all four dependent variables as follows: ATQ-N: F (3, 202) = 88.61, $p < .001$, $\bullet^2 = .57$; ATQ-P: F (3, 202) = 48.70, $p < .001$, $\bullet^2 = .42$; CPNT-N: F (3, 202) = 120.61, $p < .001$, $\bullet^2 = .64$; and CPNT-P: F (3, 202) = 27.18, $p < .001$, $\bullet^2 = .29$. Effect sizes for all four measures within the CCS model were large (i.e., larger than .14, Cohen, 1988; cited in Stevens, 1996), with the smallest effect being for test anxious positive content and largest effect for test anxious negative content.

Additionally, the Newman-Keuls post-hoc tests were conducted on each of the four measures to determine which pairs of group means differed significantly. The results indicated that each group was different from every other group on the measures of negative cognitions specific to depression (ATQ-N) and test anxiety (CPNT-N). Specifically, on the ATQ-N, control group scores were the lowest and comorbid group scored the highest, whereas depressed group, predictably, scored higher than the test anxious group. The pattern of scores was similar on the CPNT-N. On the ATQ-P and CPNT-P, only some groups showed differences. The table of obtained directional means is presented below.

Table 8

Actual Directional Means for Cognitive Measures

	Contrasts for the Groups					
1a) ATQ-N	D > TA	TAD > TA	D < TAD	TA > C	D > C	TAD > C
1b) ATQ-P	D < TA	TAD < TA	D = TAD*	TA = C*	D < C	TAD < C
1c) CPNT-N	D < TA	TAD > TA	D < TAD	TA > C	D > C	TAD > C
1d) CPNT-P	D = TA*	TAD < TA	D > TAD	TA < C	D < C	TAD < C

Note. An asterisk * denotes a lack of significance at .05 level.

The results suggest that college women with varying degrees of test anxious and depressive symptomatology (i.e., high or low) have unique positive and negative thinking patterns, as evidenced by the significantly different group scores endorsed on the aggregate of measures, including the ATQ-N, ATQ-P, CPNT-N, and CPNT-P. Thus, *Hypothesis 1* was supported. The results further suggest that "purely" depressed college women show higher levels of negative thinking and lower levels of positive thinking than "purely" test anxious women and those with low levels of depression and test anxiety, as evidenced by the significantly higher scores endorsed on the ATQ-N and significantly lower scores on the ATQ-P. Thus, *Subhypotheses 1a)* and *1b)* were supported. Moreover, college women with elevated test anxiety appeared to have higher overall negative thinking than those with depression only and controls, as evidenced by higher scores on the CPNT-N scale. Thus, *Subhypothesis 1c)* was also supported. Despite showing less positive thinking than controls, participants with test anxiety did not exhibit any differences in their positive thinking related to test anxiety when compared to their "purely" depressed counterparts, as evidenced by similar scores on the CPNT-P scale. Thus, the cognitive content specificity component of *Subhypothesis 1d)* was not supported. All additional directional components within the *Subhypotheses 1a)* through *1d)* were supported.

4.2.2 Analyses of Hypothesis 2

Hypothesis 2 predicted that four groups of college women with differing (high or low) levels of test anxiety and depression would have significantly different mean scores on a linear composite of BSOM ratios derived from test anxiety- and depression-relevant cognitions.

4.2.2.1 Descriptive Statistics

The means and ranges for test anxiety- and depression-specific BSOM ratios are presented in Table 9 below.

Table 9

Mean Scores, Standard Deviations, and Categories of the BSOM Ratios

		Groups			
		TA (n = 51)	D (n = 51)	TAD (n = 52)	C (n = 52)
BSOM-D	M (SD)	.82 (.13)	.56 (.17)	.51 (.13)	.93 (.12)
	Category	PD: O	CD	CD	PM
BSOM-TA	M (SD)	.47 (.13)	.60 (.21)	.34 (.14)	.82 (.11)
	Category	CD	SCD	FCD	PD: O

Note. PM – Positive Monologue; PD – Positive Dialogue: SO - Superoptimal, O - Optimal, N - Normal; SCD – Successful Coping Dialogue; CD – Conflicted Dialogue; FCD – Failed Coping Dialogue; ND – Negative Dialogue: Mod - Moderate; and NM – Negative Monologue.

4.2.2.2 Inferential Statistics

In order to address *Hypothesis 2*, a one-way four-group ("purely" depressed, "purely" test anxious, "mixed" depressed-test anxious, and control) MANOVA was performed on a liner composite of two dependent continuous variables, i.e., the BSOM-TA and BSOM-D ratios. The MANOVA revealed significant differences between groups, Wilks' lambda = 0.19, F (6, 402) = 89.45, $p < 0.001$. Thus, *Hypothesis 2* was supported.

Analyses of Subhypotheses 2a) and 2b).

The main prediction of *Subhypothesis 2a)* was that using the ATQ-N and ATQ-P, "purely" depressed participants would have significantly lower mean BSOM-D ratios than controls. The main prediction of *Subhypothesis 2b)* was that using the CPNT-N and CPNT-P, "purely" test anxious participants would have significantly lower mean BSOM-TA ratios than control individuals.

Inferential Statistics. Given the significance of the MANOVA, separate univariate ANOVAs were performed, yielding significant differences on each of the two continuous dependent variables. For the BSOM-D, the ANOVA yielded F (3, 202) = 129.56, $p < 0.001$, $\bullet^2 = .66$. Similarly, for the BSOM-TA, the results indicated that F (3, 202) = 92.55, p < 0.001, $\bullet^2 = .58$. Both effect sizes were large. For the results of the multiple comparison Newman-Keuls post-hoc tests, see Table 10 below.

Table 10

Actual Directional Means for the BSOM Ratios

	Contrasts for the Groups					
2a) BSOM-D	**D < TA**	TAD < TA	*D = TAD**	TA < C	D < C	TAD < C
2b) BSOM-TA	**D > TA**	*TAD < TA*	D > TAD	TA < C	D < C	TAD < C

Note. Boldface type denotes the relationships predicted by the CCS model alone. Italics type denotes secondary relationships predicted by the BSOM model alone. An asterisk * denotes a lack of significance at .05 level.

Most of the directional differences were as predicted. Specifically, the results indicated that, on average, BSOM-D ratios of "purely" depressed women were lower than those of controls and "purely" test anxious women. Thus, *Subhypothesis 2a)* was supported. Similarly, the findings were reflective of lower BSOM-TA ratios for "purely" test anxious participants than for controls and "purely" depressed individuals. Thus, *Subhypothesis 2b)* was also supported. The only surprising result was that "mixed" (TAD) group did not differ from the "purely" depressed group on the BSOM-D ratios, while the same group showed lower BSOM-TA scores compared with the "purely" test anxious group.

4.2.3 Analyses of Hypothesis 3

Hypothesis 3 predicted that all four groups of participants would produce average disorder-relevant BSOM ratios that would fall within the precise qualitative and quantitative parameters predicted by the BSOM model.

4.2.3.1 Descriptive Statistics

The mean BSOM ratios and corresponding interval categories for test anxiety and depression are presented in Table 9 above. The predictions for the BSOM-TA ratios were supported across groups. In contrast, only one prediction for the BSOM-D ratio was supported (i.e., for the "purely" depressed group). The rest of the predictions for depressive content were not supported in that: (1) the mean ratio for the control group fell in the PM category instead of PD category (higher mean ratio than predicted) and (2) the average ratio for the "mixed" group fell in the same category as "purely" depressed group, i.e., CD instead of predicted FCD (higher mean ratio than hypothesized). Thus, overall, *Hypothesis 3* was only partially supported.

CHAPTER 5

DISCUSSION

The major purpose of this study was to examine content specificity of self-reported cognitions in four groups of college women with varying affective symptomatology (i.e., high level of test anxiety, high level of depression, both test anxiety and depression, and without either). This task was accomplished using two models, i.e., (1) *Cognitive Content Specificity* (CSS) *hypothesis* (A.T. Beck, 1976), which addressed positive and negative content separately, and (2) *CCS hypothesis integrated with the Balanced States of Mind* (BSOM) *model* (Schwartz, 1997), which involved ratios of positive to the sum of positive and negative cognitions. Results indicate that although the CCS hypothesis yielded strong support for negative content across both disorders (*Hypothesis 1*), the addition of the BSOM model component (*Hypothesis 2*) aided in discriminating between test anxious symptoms and those of depression. Additionally, the applicability of the specific parameters of the BSOM model to disorder-specific content was ascertained (*Hypothesis 3*).

In this chapter, the findings from the current study are first summarized and integrated with previous research in the field of cognitive content specificity of anxiety and depression. Theoretical and clinical implications from the current study are then explored. Lastly, the study's strengths and limitations are discussed and suggestions for future research are provided.

5.1 Discussion of Hypotheses and Integration of Results with Literature

When examining the literature, it must be noted that most reviewed evidence came from studies of college students, unless otherwise indicated.

5.1.1 Hypothesis 1: CCS Hypothesis

Hypothesis 1 predicted that college women with "pure" test anxiety, "pure" depression, both test anxiety and depression, and those without significant symptoms of

either would have a distinct profile of positive and negative cognitions. This hypothesis was supported. The results supported *Hypothesis 1* and primary predictions of three out of four of its subhypotheses. The findings are in line with the CCS empirical research, which mostly concurs with group differences between subclinical expression of depression and social anxiety (e.g., Bruch et al., 1993; Ingram, 1989a). Additionally, the results help fill the gap in the body of literature on cognitive specificity of test anxiety and depression in college students, which does indicate distinctiveness of test anxious cognitive processes compared to depression (e.g., Ingram et al., 1987; Sanz & Avia, 1994, study 1) but until now has not tested specificity of test anxious negative and positive content.

5.1.1.1 Support for Subhypotheses 1a) through 1d)

From *Hypothesis 1*, four specific subhypotheses were generated about directionality of the group differences. Despite the significant group differences found on all four cognitive disorder-relevant dependent measures and large effect sizes, not all directional predictions were confirmed (see section *5.1.1.1* below). For details of contrast support within each subhypothesis, see Table 8, section *4.2.1.1*.

Subhypothesis 1a).

Primary Relationships. *Subhypothesis 1a)* mainly predicted elevated negative cognitions in depressed college women on depression-specific measures, when compared to women with test anxiety-only and those without test anxiety or depression (i.e., D > TA, D > C). This subhypothesis was supported. Obtained support for *Subhypothesis 1a)* adds credibility to Beck's proposition that in contrast to anxious individuals, depressed individuals exhibit increased self-referent negative thinking, which is pervasive and manifests itself cross-situationally (A.T. Beck, 1976; D. A. Clark et al, 1999). Empirically, support for *Subhypothesis 1a)* is similar to that of the body of clinical adult literature on depression, which has compared depressed group with controls (e.g., Crandell & Chambless, 1986; Dobson & Shaw, 1986; Harrell & Ryon, 1983; Kendall, Howard, & Hays, 1989) and anxiety group (A.T. Beck et al., 1987; Blackburn, Jones, &

Lewin, 1986; D.A. Clark et al., 1989; Hollon et al., 1986; Woody et al., 1998). The current results also concur with the CCS research in college students, which has been less convincing but still showed consistent empirical backing for specificity of negative content. Those with depressive symptoms scored higher on negative depressive content than those with social anxiety (e.g., Bruch et al., 2003; Ingram, 1989a; McDermut & Haaga, 1994) and test anxiety (e.g., Ingram et al., 1987), while they also scored higher than controls. There were a few exceptions that did not find support (e.g., McKellar et al., 1996; Sanz & Avia, 1994, study 2).

Additionally, within *Subhypothesis 1a)* it was expected that the "mixed" condition would yield more negative content cognitions related to depression than either test anxious or control condition (i.e., TAD > TA, TAD > C). These relationships were supported. Performance of the "mixed" group on depression-relevant negative content concurs with some clinical studies (e.g., Woody et al., 1998). Similarly, college student studies overwhelmingly found that this group was more dysfunctional than anxiety group (e.g., Bruch et al., 2003; Ingram, 1989a; Ingram et al., 1987; McKellar et al., 1996; Sanz & Avia, 1994, studies 1 and 2), contributing to specificity of depression. Elevated scores of the "mixed" group compared to controls further add to a convincing research base (e.g., Bruch et al., 2003; Ingram, 1989a; Ingram et al., 1987; McKellar et al., 1996; Sanz & Avia, study 1 and 2).

Exploratory Relationships. Exploratory relationships for *Subhypothesis 1a)* involved those between the "mixed" group and "purely" depressed group and between the "purely" test anxious group and control group (i.e., TAD vs. D, TA vs. C). The comorbid group scored higher than the depressed group on negative depressive content, which is in line with several nonclinical studies (e.g., Ingram et al., 1987; McKellar et al., 1996; Sanz & Avia, 1994) but contrary to a few others (e.g., Bruch et al., 2003; Ingram, 1989a; Woody et al., 1998, clinical sample) that did not yield such differences. The finding that those with anxiety outscored controls on negative depressive content is similar to the outcome of the study by Calvete et al. (2005) but contradicts the findings of

other nonclinical studies, which found no group differences (e.g., Bruch et al., 2003; Ingram, 1989a, 1989b; McKellar et al., 1996; Sanz & Avia, 1994, study 2).

Subhypothesis 1b).

Primary Relationships. *Subhypothesis 1b)* stated that depressed college women would have lower positive automatic thinking scores on a depression-relevant measure than test anxious women or controls (i.e., D < TA, D < C). This subhypothesis was also supported. The finding that those with depression have fewer positive cognitions compared to those without it goes along with Beck's proposition of low positive thinking in depression (A.T. Beck, 1976) and is mostly consistent with empirical evidence in clinical populations (see D. A. Clark et al., 1999 for a review of literature). However, the results are only partially consistent with ambiguous and scanty CCS research in college students, which did not yield significant differences between depressed and anxious groups (Bruch et al., 2003; Ingram, 1989b; McKellar et al., 1996), while finding that depressed group scored below controls (e.g., Bruch et al., 2003; Ingram, 1989a). Besides using a different anxiety type, the disparity in findings regarding depression-anxiety distinction may be attributable to several factors, such as differential group selection (in McKellar's study, the comorbid group additionally had negative affect) and smaller group size.

In addition to the relationships above, *Subhypothesis 1b)* also predicted that the comorbid group would have less positive cognitions than the test anxious and control groups (i.e., TAD < TA, TAD < C). These predictions were supported. The tendency of those with comorbid condition to have lower depressive positive content compared to those with anxiety is consistent with several studies in college students (Bruch et al., 2003; Ingram, 1989b), strengthening evidence for specificity of depression. However, a few studies did not yield group differences (e.g., Ingram, 1989a; McKellar et al., 1996). Similar ambiguity was seen in empirical literature addressing comorbid and control group differences.

Exploratory Relationships. Exploratory relationships for *Subhypothesis 1b)* encompassed the same contrasts as for *Subhypothesis 1a)* (i.e., TAD vs. D, TA vs. C). The results, however, were very different from those for negative content in that no differences were found between groups. Thus, the presence of test anxiety symptoms within the group did not result in this group's higher likelihood to be differentiated from the depression-only or control group. Similar levels of depression in the two groups (see section 4.1) might have resulted in a lack of significance, implicating the failure of test anxiety to contribute to depressive positive content. Empirical literature is not uniformly consistent with the findings for both contrasts, with McKellar et al. (1996) concurring with a lack of differences, but Bruch et al. (2003) and Ingram (1989a), (1989b) showing the opposite pattern.

Subhypothesis 1c).

Primary Relationships. *Subhypothesis 1c)* proposed significantly higher negative test anxious cognitions in "purely" test anxious women compared to depressed women and controls. Obtained support for *Subhypothesis 1c)* reflects test anxiety-specific propensity towards negatively-valenced cognition stream, with the focus on the self in relation to own performance and fears of being evaluated by others (Ingram et al., 1987; Zeidner, 1998). The findings are consistent with several CCS clinical studies (e.g., A.T. A.T. Beck et al., 1987; Clark et al., 1989) in that they showed the unique nature of anxious negative content, although a few studies (e.g., Woody et al., 1998) contradict the CCS predictions. Further, current findings add to the ambiguous evidence of negative content specificity of anxiety disorders in college students (Bruch et al., 2003, study 1; Sanz & Avia, 1994, studies 1 and 2), which contradicts the obtained differences between anxious and depressed groups, while concurring with the present study in that anxiety results in higher negative thinking compared to controls.

Within the additional predictions for *Subhypothesis 1c)*, it was expected that the "mixed" group would yield more negative cognitions than the controls and depression-only group (i.e., TAD > C, TAD > D). These contrasts were supported. Despite being few

in number, empirical studies concur with both group distinctions in a clinical study (e.g., Woody et al., 1998) and college student samples (e.g., Bruch et al., 2003; Sanz & Avia, studies 1 and 2).

Exploratory Relationships. Exploratory relationships for *Subhypothesis 1c)* involved those between the "mixed" group and test anxious group and between the depressed group and control group on test anxiety content (i.e., TAD vs. TA and D vs. C). Indeed, the "mixed" group had more negative cognitions than test anxious group, while depressed group had more negative test anxious thinking than controls. The obtained group differences point to the important role of depressive symptomatology in contributing to group differentiation on negative test anxious content. The comorbidity-versus-anxiety distinction is consistent with a few clinical (e.g., Woody et al., 1998) and nonclinical studies (e.g., Bruch et al., 2003; Sanz & Avia, studies 1 and 2). However, differences between depressed and control groups garnered less convincing empirical validation, with some providing support (e.g., Bruch et al., 2003; Calvete et al., 2005), while others finding no significance (e.g., Sanz & Avia, 1994, study 2).

Subhypothesis 1d).

Primary Relationships. In contrast to the subhypotheses above, *Subhypothesis 1d*) was the only one that did not unequivocally support cognitive specificity contentions (i.e., TA < D, TA < C). Specifically, positive anxious cognitions of women with test anxiety turned out to be equivalent to those of women with depressive symptoms (i.e., TA = D), although both were lower than those of their relatively symptom-free peers. The main findings of this subhypothesis are similar to those studies reporting a lack of specificity of positive anxious content to anxiety (e.g., Sanz & Avia, study 2) but contradict those that discovered that anxiety group was lower than depressed group (e.g., Bruch et al.. 2003, study 1). In contrast, the presence of group differences between test anxious group and controls on positive anxious content is well established and goes along with the non-CCS literature in test anxiety (e.g., Blankstein et al., 1991; Blankstein & Flett, 1990; Galassi, 1981a, b) and social phobia (e.g., Beidel et al., 1985). The findings

also concur with the limited CCS research in college students by Bruch et al. (2003, study 1), although they contradict a few studies that found no group differences (e.g., Sanz & Avia, 1994, studies 1 and 2).

In addition to the two above-mentioned contrasts, *Subhypothesis 1d)* proposed that the test anxiety group would also have fewer positive cognitions with evaluative content, compared to depression and control groups (i.e., TAD < D, TAD < C). These contrasts were supported, providing additional evidence in favor of cognitive specificity of test anxiety. The findings add to the limited number of college student studies, which did not yield uniform results. Specifically, current study concurs with the research by Bruch et al. (2003, study 1) and contradicts the one by Sanz and Avia (1994, studies 1 and 2).

Partial support for *Subhypothesis 1d)* signifies the ability of test anxiety to hold its own against controls but challenges the uniqueness of positive anxious cognitions against depression. The obtained findings helped amass preliminary evidence on positive anxious content comparison of depression and anxiety, which is lacking in nonclinical literature on test anxiety and is scanty for social phobia.

Exploratory Relationships. Exploratory relationships for *Subhypothesis 1d)* incorporated the same contrasts as for *Subhypothesis 1c)* (i.e., TAD vs. TA, D vs. C). The results were also similar to those of *Subhypothesis 1c)* in that significant differences between groups were found, i.e., comorbid group had fewer positive cognitions than test anxious group and depressed group had fewer positive cognitions than controls. Thus, the presence of depressive symptoms in a group resulted into this group's higher likelihood of being differentiated from test anxious and control groups on positive depressive content. The literature on the subject is characterized by ambiguity. Bruch et al.'s (2003) study found a difference between comorbid and anxious groups similar to the current study, but several other studies failed to provide support the distinction (e.g., Sanz & Avia, 1994, studies 1 and 2). Significant differences between the depressed group and controls were contradictory to the findings of both Bruch et al. (2003, study 1) and Sanz

and Avia (1994, study 2), despite similarities in design. The disparity can be due to group selection differences, smaller group size, and a different type of anxiety used.

5.1.1.2 Cross-Content Summary

Valence.

Unequivocal support for *Subhypotheses 1a)* and *1c)* reflects the negative nature of depressive and anxious cognitions. Current data also indicate that having depression is "not the only key to experiencing negative self-statements" (Sanz & Avia, 1994, p. 121). This is in line with most current empirical literature. In contrast to negative content, cognitive positivity, i.e., did not receive uniform support because both test anxiety and depression were characterized by low positive thoughts, but only depression had disorder-specific positive content. The absence of a clear pattern within positive content across disorders (*Subhypotheses 1b)* and *1d*)) is consistent with the CCS literature, although a dearth of clinical and nonclinical studies investigating positive content (particularly, in anxiety) has resulted in a lack of the reliable positive content research base. The findings are also consistent with the presence of positive affectivity in both depression and social phobia (e.g., Brown et al., 1998; Watson, Clark, & Carey, 1988; Watson, Gamez, & Simms, 2005; both cited in Watson, 2005). This study contributes to the contradicting literature in the area.

Disorder Content.

For the "pure" conditions of depression and anxiety, the results are consistent with the literature in that depressed group showed better differentiation on its respective content than test anxiety on its content, and these groups were less dysfunctional than the comorbid group and more dysfunctional than the controls.

"Pure" Conditions. Taken together, results from *Subhypotheses 1a)* and *1b)* provide solid support for the unique relationship between *depressive content* and depressive symptoms. Those with depressive symptoms manifested more depression-related negative cognitions and less positive cognitions than those with low levels of depression and those with test anxiety. The results also manifest congruence with the

CCS research in social anxiety and depression, but there is not enough data from the CCS studies of test anxiety and depression, making empirical support preliminary.

Results from *Subhypotheses 1c)* and *1d)* reflect partial support for the uniqueness of *anxious content*. Specifically, they cast doubt on specificity of positive self-statements to test anxiety. Current results show a pattern similar to the CCS studies of social anxiety content, which manifest somewhat weak evidence of anxiety specificity. The unique cognitive profile of test anxiety has been corroborated by research in anxious cognitive processes (e.g., Ingram et al., 1987; Sanz & Avia, 1994). Thus, test anxiety appears to have negative content elements that are different from depression, yet demonstrates some overlap with depression on positive content.

Comorbid Condition. In addition to contributing to the specificity of the "pure" conditions of depression and anxiety, this study also shed the light on the comorbid condition. For both depression and test anxiety, the "mixed" group was predicted to score the highest on the measures of negative cognitions and the lowest on the measures of positive content. The results reveal that participatns with both depression and test anxiety tend to have the highest level of negative thinking and lowest level of positive thinking across disorders (with the exception of positive depressive thinking measure). The comorbid group showing the highest negative thinking is consistent with several CCS studies, including those with test anxiety component (e.g., Ingram et al., 1987; Sanz & Avia, 1994, study 1 and 2). However, the findings contradict a few other studies, such as Bruch et al. (2003, study 1) and Woody et al. (1998), which found that comorbid group's performance differed depending on the disorder content. Further, lowest positive thinking by comorbid group across content has been supported by a few nonclinical studies (e.g., Bruch et al., 2003, study 1), but the evidence is not compelling.

Controls. The current study confirmed that control group tends to be least cognitively maladaptive of all groups (with the exception of the positive depressogenic cognition shared equally with "purely" test anxious group). This study's findings are similar to those by Bruch et al.'s (2003, study 1) in that control group largely engaged in

the least overall negative thinking and highest overall positive thinking. Several other nonclinical studies with a similar design are contradictory to this profile in that they found the control group to score the same as several other groups on negative measures (e.g., Ingram, 1989a, b; Ingram et al., 1987; Sanz & Avia, 1994, study 1 and 2). Overall, no CCS studies were identified that found the control group to unequivocally and consistently score the lowest on positive measures of both anxiety and depression, indicating that high positive thinking is not the prerogative of those without psychopathology.

5.1.2. Hypothesis 2: Integrated CCS/BSOM Model

Hypothesis 2 predicted that the four groups of the depressed, test anxious, "mixed", and low-pathology women would manifest different disorder-related average BSOM ratios. Results support *Hypothesis 2*. Specifically, the test anxious group scored differently from other groups on test anxiety-relevant measures, while the depressed group scored differently on the depression-relevant measures, providing evidence in favor of analyzing disorder-relevant BSOM ratios simultaneously within the context of the CCS theory. The comorbid group also yielded content differences, providing additional information in support of cognitive content specificity. Research in specificity of anxious and depressive cognitive ratios has not been prolific and is characterized by the virtual absence of the clinical adult studies. Current data contribute to the few empirical studies addressing group differences in college students (e.g., McKellar et al., 1996) and children (e.g., Ronan & Kendall, 1997).

5.1.2.1 Support for Subhypotheses 2a) and 2b)

Two directional subhypotheses were generated from *Hypothesis 2*. Within the subhypotheses, all primary directional predictions were supported (see Table 9, section *4.2.2.2* above).

Subhypothesis 2a).

Primary Relationships. All four directional contrasts of the *Subhypothesis 2a)* were confirmed in the current study. Specifically, *Subhypothesis 2a)* produced expected

differences for groups of "purely" depressed participants on their disorder-relevant BSOM-D ratios, i.e., those with depression-only had lower average BSOM-D ratios compared to their peers with test anxiety or controls (i.e., D < TA, D < C). Specificity of the SOM-D ratios to depression and not to anxiety has been corroborated by limited empirical evidence (e.g., McDermut & Haaga, 1994; Ronan & Kendall, 1997 in children). However, the results partially contradict a study by McKellar et al. (1996), which did not find group differences. Additionally, the results contribute to the scanty non-CCS research in depression (e.g., Garamoni et al., 1991; Schwartz et al., 2002), which showed that BSOM-D ratios for depressed participants tend to be lower than those of participants with low/remitted depression. Further, as predicted, the "mixed" group's BSOM-D ratios were predicted to be lower than those for test anxiety and controls (i.e., TAD < TA, TAD < C). Several empirical studies were similar to current research in that they provided support for the differentiation of the comorbid group from anxious individuals and controls (e.g., McKellar et al., 1996; Ronan & Kendall, 1997).

Secondary Relationships. The BSOM model alone predicted that the "mixed" group would yield more dysfunctional ratio compared to "pure" depression (i.e., TAD < D). In this study, the groups were equal (i.e., TAD = D), making it the only unsupported contrast within *Subhypothesis 1a)*. Such lack of support is similar to the study by Ronan and Kendall (1997) with children but is different from the one by McKellar et al. (1996), which did find differences. As stated above (see section 5.1.1.1), study's selection procedure for the "purely" depressed group might have impacted the results. Overall, the absence of support for this contrast reflects a somewhat weak of role of test anxiety in adding to the effects of depression on depressive content differentiation.

Exploratory Relationships. Neither the CCS nor the BSOM model alone or jointly fully explain the relationship between test anxiety and controls on depressive content (i.e., TA vs. C). In this study, the test anxious group had more dysfunctional BSOM-D ratios than the control group. This can be attributed to shared variance between anxiety and depression. The results were different from those yielded by positive content

but similar to those generated by the CCS model on negative content, with the implication that the negative content element in cognitive ratios plays a more important role in accounting for group differentiation. Several studies support this finding in college students (e.g., McKellar et al., 1996; Nasby & Russell, 1997) and children (e.g., Ronan & Kendall, 1997; Treadwell & Kendall, 1996).

Subhypothesis 2b).

Primary Relationships. *Subypothesis 2b)* mainly predicted that test anxious women would have significantly lower average BSOM-TA ratios than those with depression-only or controls (TA < D, TA< C). These relationships were supported. CCS research, however, does not confirm the anxiety-depression BSOM distinction (e.g., Ronan & Kendall, 1997; McDermut & Haaga, 1994), whereas differences between anxiety and controls have been documented (e.g., Ronan & Kendall, 1997). The divergent profiles of test anxious individuals and controls found in this study were also in line with the non-CCS research in anxiety disorders (Arnkoff et al., 1992; Bruch et al., 1991; Glass & Furlong, 1990; Heimberg et al., 1990; Michelson, Schwartz, & Marchione 1991; Nasby & Russell, 1997; Schwartz & Michelson, 1987), including test anxiety (Topman et al., 1992), although an affective confounding problem limits applicability of such research.

Also, the "mixed" group's BSOM-TA ratios were predicted to be lower than those for "pure" depression condition or controls (TAD < D, TAD < C). These relationships were supported unequivocally in the current study. Both results were similar to those obtained by Ronan and Kendall (1997) in children.

Secondary Relationships. The BSOM model also predicted that the comorbid group would yield, on average, more dysfunctional cognitive ratios compared to those "pure" test anxious group (i.e., TAD < TA), due to comorbidity being associated with higher cognitive psychopathology. In this study, this difference was supported. The results are consistent with the findings of Ronan and Kendall (1997), corroborating the

important role of depressive symptoms in cognitive disturbance and cognitive differentiation.

Exploratory Relationships. In the only exploratory relationship within *Subhypothesis 2b)*, the depressed group produced more dysfunctional ratios than control group (i.e., D < C), which is indicative of depressive symptoms contributing to test anxious content. A study by Ronan and Kendall (1997) supported such distinction. Other empirical evidence is missing.

5.1.2.2 Cross-Content Summary

"Pure" Conditions.

Predicted content specificity of the "pure" conditions was supported. On the primary relationships, the evidence of differentiating depression from test anxiety on anxious content was equally as strong as the evidence on depressive content. Weaker support for secondary relationships on depressive content does not minimize the content's connection to depression but, rather, is reflective of test anxiety syndrome's inability to impact the relationship between depression and its relevant content and create a categorically new comorbid condition. Literature partially corroborates the findings with the "pure" conditions (see section 5.1.2.1 above), but there are so few studies on the subject that extreme caution should be used when generalizing results.

Comorbid and Control Conditions.

In addition to specificity of "pure" conditions of depression and test anxiety, it was expected that across content, women with the comorbid condition would have more dysfunctional ratios than those with test anxiety, depression, or without either. This prediction was supported in all primary contrasts, consistent with the studies by McKellar et al. (1996) and Ronan and Kendall (1997). When examining the results for the control group, it must be noted that in both sets of disorder-relevant ratios, control group was supported as having the least dysfunctional ratio, a finding corroborated by the same two empirical studies above.

5.1.3. Hypothesis 3: BSOM Model applied to CCS

Hypothesis 3 suggested that all four groups of college women would have average disorder-relevant cognitive content ratios that fall within the interval parameters outlined by the BSOM model (see Table 9, section 4.2.2.2 for results). In this study, the BSOM model did not appear to fully translate into the content specificity area, consistent with mixed support in several studies with children (e.g., Kendall & Treadwell, 2007; Treadwell & Kendall, 1996).

5.1.3.1 "Pure" Conditions

Primary Relationships.

For test anxious and depressive content, expectations were similar, i.e., "pure" disorders of test anxiety and depression would produce average respective BSOM-TA and BSOM-D ratios that would fall in the Conflicted Dialogue (CD) interval, respectively. This prediction of the BSOM model was supported, i.e., both test anxious and depressed groups fell within the same interval of CD. This finding has been backed by McKellar et al. (1996) for the BSOM-D only. Current results are also consistent with the preliminary evidence of the BSOM specificity of anxiety and depression in children provided by Ronan and Kendall (1997).

Exploratory Relationships.

The predictions for the BSOM-TA ratio of the depressed group and for the BSOM-D ratio of the test anxious group were exploratory. In this study, the depressed and test anxious groups fell within the different BSOM intervals, i.e., SCD and PD: O, respectively. Initial empirical support for the exploratory prediction for depressive content was obtained by McKellar et al. (1996) who found that anxiety group fell within the SCD interval. The finding that depressed group had a more dysfunctional test anxiety-relevant BSOM ratio, compared to the depression-relevant ratio of the test anxious group, suggests that depressive symptoms contribute more to the anxious content than test anxious symptoms to the depressive content. It is contrary to the findings of Ronan and Kendall (1997), whose ratios fell within the same range of CD.

5.1.3.2 Comorbid Condition

Regardless of disorder content, the comorbid group was predicted by the BSOM model to most likely fall in the interval of Failed Coping Dialogue (FCD), associated with the lower mean and more moderate and stable maladjustment than the CD interval projected for the "pure" groups. This prediction was only partially supported, as the "mixed" group fell into two different intervals, i.e., CD for depressive content and the FCD for test anxious content. Literature comparing comorbid group to other groups on the BSOM ratios is very scanty, whether for depression or anxiety. The finding for depressive content is consistent with McKellar et al.'s study, while Ronan and Kendall's (1997) study in children provided only partial support, as their comorbid group fell within the same interval of FCD (.40). The findings yielded evidence for the more negative nature of depressive symptoms, compared to test anxious ones, as the test anxiety component contributed to a less dysfunctional ratio, compared to the depressive element.

5.1.3.3 Control Condition

Irrespective of disorder content, control group was expected to fall within the interval typically reported by researchers of sorted and unsorted samples of college students and children, i.e., Positive Dialogue (PD) (e.g., Bruch, 1997; Burgess & Haaga, 1994; McDermutt & Haaga, 1994**;** Ronan & Kendall, 1997). Unlike children in Ronan and Kendall's (1997) study, however, control participants fell within two different intervals. Although both BSOM ratios for controls were within the positive end of the BSOM scale, test anxious content yielded an average cognitive ratio that was in the optimal range of Positive Dialogue, whereas depressive content resulted in slightly more optimistic thinking (i.e., Positive Monologue; PM). The PM category is typical characterized by heightened positivity that may be adaptive short-term (Schwartz, 1997). It is not entirely unusual for the samples of adults to have higher-than-expected BSOM ratios, such as close to the PM interval (e.g., Friedman et al., 2002, affective ratios of .90). Further, an elevation might have been a result of group selection (i.e., "low scorers"). It is possible that a control group selected for average symptoms could have

had ratios that were more dysfunctional and closer to the low end of the PD interval (e.g., Ronan & Kendall, 1997, in children) or even within the SCD interval. Finally, neither content ratio for the control group was close to the "golden section" of .62 suggested by the original SOM model (Schwartz & Garamoni, 1986, 1989). This finding speaks in favor of the validity of BSOM model, which allowed for the shift of the optimal ratio upward, towards a more optimistic outlook than its predecessor.

5.1.4 Tying It All Together: The CCS and CCS/BSOM Model Comparison

5.1.4.1 Disorder Specificity

The main goal of the present study was to compare the two models of cognitive content differentiation in order to determine if integrating the BSOM approach with the CCS model would produce better disorder specificity results. The summary of contrast support for both models can be found in Table 11 below.

Table 11

Support for Cognitive Content Specificity of Depression and Test Anxiety by Model

	Content			
	Depressive		Test Anxious	
CCS-Negative				
"Pure"	D > TA	D > C	**TA > D**	**TA > C**
"Mixed"	TAD > TA	TAD > C	**TAD > D**	**TAD > C**
CCS-Positive				
"Pure"	D < TA	D < C	**TA = D***	**TA < C**
"Mixed"	TAD < TA	TAD < C	**TAD < D**	**TAD < C**
BSOM				
"Pure"	D < TA	D < C	**TA < D**	**TA < C**
"Mixed"	TAD < TA	TAD < C	**TAD < D**	**TAD < C**

Note. Boldface type indicates relationships relevant to test anxiety content; regular type font indicates depressive content. An asterisk * denotes a lack of support for the contrast at the level of .05.

When evaluating both models, one should consider the support for primary relationships on disorder content and effect sizes. It is apparent that the predictions of the joint CCS/BSOM model have resulted in better overall differentiation on primary contrasts than those of the CCS model. Specifically, the combined model provided stronger support for test anxiety and for positive content than the CCS approach alone. When the valence components of the CCS model are analyzed separately, both the negative content component of the CCS model and the CCS/BSOM model yield equal (100%) support for primary contrasts for both anxiety and depression. The effect sizes for the two models were large for both disorders. It is noteworthy, however, that the CCS/BSOM model yielded a larger effect size for depression than either component of the CCS model.

Additionally, examining directional contrasts can provide a visual of the robustness of the BSOM ratios. In *Hypothesis 1*, the findings for depressive negative content were TAD > D > TA > C, while findings for the positive content were TAD = D < TA = C. When compared to the BSOM model for depression, i.e., TAD = D < TA < C, one can see that the BSOM model was able to partially compensate for the lack of differences generated by positive content. Similarly, the results for test anxious negative content were: TAD > TA > D > C, while findings for the positive content were: TAD < TA = D < C. These are contrasted with the BSOM relationship of TAD < TA < D < C, where once again the BSOM ratios were able to mitigate positive content's weakness in group differentiation.

Present empirical evidence on the differentiating role of cognitive content seems to point to two disparate conclusions: (1) either negative thoughts play more significant role in psychopathology than the cognitive balance, presumably due to their stability and

pervasiveness (e.g., Minor & Gold, 1986), or (2) the balance is equally important as negative thoughts (e.g., Calvete & Cardeñoso, 2002; Calvete & Connor-Smith, 2005). The current study sides with the second perspective but also provides additional information about an advantage of the BSOM ratios over negative content alone. Assessing cognitive ratios is beneficial, as they appear to possess differentiating power that is similar to if not higher than that of the single-valence content, while encompassing more information.

5.1.4.2 Disorder Effects

In addition to allowing to establish cognitive content differentiation, the current research design lend itself to examination of the effects of one disorder on the cognitive content of the other, i.e., the effects of depression on the test anxious content and of test anxiety on depressive content. Specific relationships are outlined in Table 12 below.

Table 12

Support for Disorder Effects by Model

	Content Specificity Model					
	Hypothesis 1				Hypothesis 2	
	CCS-Neg		CCS-Pos		CCS/BSOM	
Depression on TA content	D > C	TAD > TA	*D < C*	*TAD < TA*	**D < C**	**TAD < TA**
Test Anxiety on D content	TA > C	TAD > D	*TA = C**	*TAD = D**	**TA < C**	**TAD = D***

Note. Regular type indicates relationships relevant to negative content of the CCS model; Italics type indicates relationships relevant to positive content of the CCS model; Bold type indicates relationships relevant to the integrated CCS/BSOM model. An asterisk * denotes a lack of support for the contrast at the level of .05.

From Table 12, it is apparent that across hypotheses, there is observed primacy of depression over test anxiety, as the influence of depression was observed in nine out of nine contrasts, whereas the effect of test anxiety was demonstrated in six out of nine contrasts. Thus, in this study, the presence of depression in anxiety posed a more serious affective confounding problem to depressive content differentiation than the presence of specific anxiety disorder comorbid with depression did to test anxious content differentiation.

Overall, although testing predictive powers of either model was outside the scope of this study and the relative influence of the cognitive balance and negative thoughts on disorder content was not established, this study concurs with the literature above in that negative content and the BSOM ratios play a more important role in differentiation of psychopathology syndromes than positive content alone.

5.1.5 Summary

The current study attempted to replicate some of the methodology and main questions of the research by Ingram et al. (1987) and Ronan and Kendall (1997) in order to examine content specificity of current cognitive activity in test anxiety and depression. The present findings only partially concurred with the two studies above.

The research confirmed a suggestion that integrating different models within the CCS framework can lead to improved content differentiation versus analyzing positive content alone but not necessarily over negative content alone. The results yielded evidence in favor of content specificity of negative cognitions and BSOM ratios and partial evidence in favor of the uniqueness of positive cognitions in test anxiety and depression. Further, the data provided convincing support for the integration of the CCS hypothesis with the BSOM model, although only partial support for the application of the BSOM predictions to disorder-specific content. Additionally, the results point to the primacy depressive symptoms over those of test anxiety in terms of contributing to cognitive content differentiation. The findings bear similarity to existing CCS clinical and nonclinical research in depression and anxiety but also add to their ambiguous nature.

Given the inconsistencies and gaps in the literature, as well as its paucity, the results help accumulate preliminary evidence for content specificity of cognitive products in test anxiety and depression.

In the following section, theoretical underpinnings of current results for conceptualization of test anxiety and depression and relevant theories and models are presented.

5.2 Theoretical Implications

This study contributed to the refinement of conceptual models in the area of test anxiety and depression by attempting to attain amalgamation of existing theoretical perspectives in the cognitive content areas.

5.2.1 Disorder Conceptualization

Conceptually, current findings provide preliminary evidence for the significance of positive and negative content in test anxiety and add to the body of evidence on content specificity of depression, as well as contribute to the study of inner speech in affective disorders. Sanz and Avia (1994) explain the discriminating role of cognitions by the fact that they are contained within the syndromes of both disorders. Differentiating between the two conditions on cognitive content supports the assumption that test anxiety and depression psychopathological states are likely independent of each other and that these cognitive symptoms are an integral part of both disorders. A caveat is that since it may not be possible to isolate cognitive variables completely whether on the basis of theory or empirically, any propositions of specificity should be treated in relative rather than absolute terms (Ingram & Malcarne, 1995).

Cognitive elements of most other anxiety disorders (with the exception of panic disorder, which is well researched in cognitive theory) are still to be unraveled (D. A. Clark, 2001). Although it is premature to conclude that cognitive content can be used to define test anxiety, it is certainly important to continue work on discovering this disorder's cognitive marks, so that they can be incorporated in the future theoretical

models. Theorists are also encouraged to identify more creative ways of conceptualizing test anxiety, e.g., by integrating current psychoeducational investigations with literature on clinical anxiety disorders (particularly social phobia), sport psychology (i.e., performance anxiety), and cross-cultural perspective (e.g., Bodas & Ollendick, 2005). In regards to depression, although cognitive elements of its clinical expression are well grounded in theory and research, its unique cognitive profile in college students (especially positive content) does not boast equally solid foundation. This study indicates that depressive symptoms in a nonclinical population can demonstrate differentiation similar to that of a clinical disorder, provided that the anxiety is specific enough. Additionally, stronger depression effects invite a conclusion that depression is capable of influencing test anxiety to a higher degree on positive anxious content than test anxiety affects depressive positive content.

5.2.2 Hypothesis 1

5.2.2.1 Contribution to Theoretical Models

Depression versus Anxiety.

Hypothesis 1 investigated Beck's cognitive content specificity approach, which proposes different cognition themes for depression and anxiety (A.T. Beck, 1976). In the current study, the "pure" disorder groups indeed differed in terms of the content of self-reported cognitive self-statements, except for positive test anxious content. The results also concur with the cognitive component model of psychopathology (Ingram & Kendall, 1987; Kendall & Ingram, 1987), which indicates that among other constructs anxiety and depression differ have distinct automatic thought content. Overall, at least on a subclinical level, the negative content appears to play a more important role in disorder differentiation compared to positive content, which failed to gain unequivocal support as a variable that sets one disorder apart from another.

In addition to partially supporting the CCS hypothesis, the findings concur with the other two hypotheses of Beck's cognitive model, i.e., those of negativity and exclusivity. The negativity hypothesis (A.T. Beck, 1967, 1976) reads that too many

negative self-referent thoughts are a paramount characteristic of depression, while the exclusivity hypothesis additionally places low positive thinking at the core of depression (A.T. Beck; D.A. Clark et al., 1999). The evidence for the validity of the exclusivity hypotheses has not been strong in the CCS research (see Chapter 2 for view) and its appropriateness has been debated (Haaga, Dyck, & Ernst, 1991). Contrary to such evidence, the study confirms the uniqueness of the diminished positivity in depressive thinking compared to controls.

The results also partially corroborate cognitive implications of the tripartite model (L.A. Clark & Watson, 1991) and its reformulations (e.g., R. Beck, Benedict, & Winkler, 2003; Cho & Telch, 2005; Mineka et al., 1998; Wilson & Rapee, 2005), which postulate the presence of low and unique positive content for depression and high negative general psychopathology factor shared by both anxiety and depression. In this study, both test anxiety and depression had high negativity with different themes. While the anxiety-depression group differences on negative content do not contradict the affective postulates of the tripartite model in that elevated negativity was found in both disorders, a shared negative content component was not identified in this study. The findings are more similar to the Mineka et al's (1998) view in which each disorder has a unique component in addition to the common one. In contrast, low positivity of depression compared to controls and compared to anxiety was observed, which concurred with the model's predictions. One problem with the tripartite model is that it cannot explain the findings regarding low anxious content being similar in both disorders. Commonality in low positive affect and possibly content was proposed and tested by several researchers as a part of a two-factor structural models (e.g., Jolly & Kramer, 1994) but did not gain significant support.

Lastly, the original CCS theory (A.T. Beck, 1976) does not provide an answer to the exploratory questions whether those with test anxiety would differ from controls on depression-relevant measures or whether those with depression would differ from controls on anxiety-related measures. The presence of such group differences,

particularly evident in the negative content of both disorders could be indicative of shared variance between the two, presumably due to a common psychopathology element proposed by the tripartite model (L.A. Clark & Watson, 1991).

Comorbid Condition.

Beck's cognitive model (1976) indicates that those with co-occurring conditions manifest dysfunctional schemas of both disorders, with the implication that the comorbid group would have the most dysfunctional profile and, therefore, be different from all other groups. Although theoretical predictions associated with this group are typically secondary to those for the "pure" groups, they play an important role in establishing a niche for comorbidity in research and theory, as they augment disorder specificity and help ascertain one disorder's additive effects on another disorder's content. In this study, the dysfunctional nature of the comorbid group was mostly supported, although its profile was thought to depend on the group selection procedure.

Normality Versus Psychopathology.

The differences between the control group and all other groups allow one to conclude whether it is the "positivity" bias (i.e., high positive content) or low negative content rather that reliably sets the low pathology individuals apart from those with psychopathology. The support for the low negative content is slightly stronger, favoring the proposition of Kendall (1984) that it is likely the "power of nonnegative thinking" that is mostly responsible for the differences between control group and "pure" disorder groups.

5.2.2.2 Positive Content's Discriminating Ability

Low positive evaluative content did not appear to be specific to test anxiety, as it was found to be also present in depression in similar levels, although both depression and test anxiety group were lower than controls. This finding goes along with the theoretical contentions of Watson (2005) about low positivity being characteristic of both social anxiety and depression.

There have been several explanations for the failure of the positive content to discern between anxiety and depression. For example, some researchers explain the differences on the positive thoughts scale as being related to such factors as personality, education, parenting, or coping (Calvete & Connor-Smith, 2005), all of which were not controlled in this study. They may argue that despite the self-report measures of positive cognitions being validated with clinical and nonclinical depression and anxiety, their nature is too general and unstable (Calvete & Connor-Smith) to be uniquely linked to any disorder, and they are conceptually different from negative thoughts, which are more specific, ingrained, and automatic.

Coping self-instructional cognitions rather than generally positive cognitions have been suggested as anxiety markers in children (Kendall & Chansky, 1991; cited in Calvete & Cardenoso, 2002). It is possible then that heterogeneity of positive content exceeds that of negative content, in a sense that it reflects not just diversity of themes but possibly of functions (directing thought, directing affect, directing behavior, completing task, etc.). Perhaps, the fact that test anxious cognitions in this study reflected mostly positive evaluative thoughts of general nature, which represented only a subset of a typical positive thinking stream and did not include a sufficient degree of self-instructional coping, resulted in a lack of test anxiety uniqueness. Similarly, it is unclear the results were due to instability of positive automatic thoughts and whether a multiple-time sample could have produced different results.

Some assert that low positive thoughts are indeed capable of differentiation within and between pathology but only in clinical populations (D. A. Clark et al., 1999). This point of view provides only partial explanation for the current findings since it explains the lack of specificity of anxiety but not of depression. Successful differentiation of the depressive positive content could have been due to the relatively high average level of depression in the depressed group, compared to other student studies. An alternative explanation is that positive anxious content and not negative content requires clinical-level anxiety symptoms to yield distinction. Since test anxiety is by definition a

nonclinical condition, this proposition needs to be tested in a performance subtype of clinical social phobia with test anxiety symptoms.

5.2.3 Hypotheses 2 and 3

5.2.3.1 Contribution to Theoretical Models

In addition to providing evidence in support of Beck's CCS hypothesis (A.T. Beck, 1976), the results of *Hypothesis 2* mostly corroborated the utility of cognitive ratios in content separation of the two disorders. While cognitive thought asymmetry is postulated to be common to depression and anxiety (Ingram & Kendall, 1987), cognitive specificity approach predicted that the content ratios would play an important role in differentiating depression from anxiety. This prediction was supported. The only lack of contrast support (TAD vs. D on depressive content) was related to the BSOM prediction and shows that the BSOM model may not be as applicable to cognitive content specificity unless it is integrated with the CCS approach.

In contrast to depression and clinical anxiety, the SOM/BSOM model (Schwartz & Garamoni, 1989; Schwartz, 1997) has not been extensively explored with test anxious individuals (for non-CCS research, see work by Topman and his colleagues). The results indicated that, similar to depression, test anxiety is characterized by distinct BSOM ratios. The current findings are also consistent with the SOM/BSOM model's (Schwartz & Garamoni, 1989; Schwartz, 1997) contention that the more pathological conditions, such as comorbidity, tend to produce lower SOM ratios. One exception was the lack of differences between the comorbid and depressed groups, likely attributable to the peculiarities of group selection.

While the directional predictions of the joint CCS/BSOM model met with success, the results of *Hypothesis 3* only partially support the application of the BSOM interval parameters to CCS, with similar results for both "pure" conditions on respective content (unequivocal support) but different results for comorbid and control groups (partial support). The latter two groups had only one out of two content ratios fall within the predicted interval. There was an identical pattern of the BSOM-TA ratio being more

dysfunctional than that for depressive content. Relatively high BSOM-D ratios for control group can be adaptive, as they are associated with "greater dampening of the stress-dysphoria relationship" (Bruch, 1997, p. 35). If it is true that those with low pathology symptoms do not have biases (Beck's theory), then theoretically, the control ratios should fall within the same interval on either content. The obtained content differences point to the presence of some sort of bias in those individuals, contradicting Beck's model. This bias could be situation-dependent, as the circumstances surrounding an evaluative situation may have created varied response in controls, resulting in a somewhat more dysfunctional cognitive profile on the test anxious content. It must also be noted that the group fell in the adjacent interval, so the differences may simply reflect the nature of the particular sample.

Beck's theory emphasizes the congruence of schema-activating event and schema-relevant cognitions. While one can attempt to use the situational congruence explanation to account for the comorbid group's considerably more dysfunctional BSOM-TA ratio compared to its BSOM-D ratio, no differences observed between "pure" test anxiety and depression groups make this hypothesis less plausible unless the schema is activated differently for the comorbid condition and "pure" conditions. More likely, depression's common psychopathology factor added to test anxiety's maladaptive nature, resulting in the more maladaptive overall profile of the anxiety-relevant cognitive content, contributing evidence to the primacy of depression over anxiety.

It is more difficult to explain the differences between the disorder-relevant ratios for the control group than their magnitude. Perhaps, the fact that the subjects took the survey around testing time made a significant impact on the test anxious cognitions of controls, indicating that situational variables cannot be discarded when assessing cognitions. To test for this, future studies need factor in "induction" of depression along with that of anxiety. Further, the contrast between identical interval patterns for the "pure" groups and content dissimilarity for the "mixed" group is somewhat puzzling. It may reflect that depression component plays a more significant role when it is

compounded by anxiety rather than when it is by itself, evidencing the effect of anxiety rather than depression observed earlier.

5.2.3.2 Cognitive Balance

Anxiety versus Depression.

When looking at anxiety-depression differentiation, the authors of the original SOM model indicate that mild (subclinical) psychopathology, such as anxiety and depression, is associated with equal proportion of negative and positive thoughts (Schwartz & Garamoni, 1986). Indeed, in this study, both test anxiety and depression were found to have unique BSOM ratios that fell within the theory-defined dysfunctional range, associated with approximately same total frequency of positive and negative cognitions. Comorbid group, however, yielded true asymmetry of negatively-valenced test anxious content but not of depressive content (the latter was no more dysfunctional than that of the depressed group). Thus, college students even with a moderate degree of self-reported affective symptomatology seldom engage in inner speech where negative thoughts outweigh positive, with cognitive symmetry varying depending on the disorder content and, possibly, appropriateness of situation.

Normality versus Psychopathology.

Segal (1988) points out that when looking at psychopathology versus normality, it is important to ascertain whether controls would have a bias of positive constructs over negative constructs or whether they have a balance of both types of constructs. According to the BSOM theory, this question becomes modified, i.e., whether the controls would have cognitions in equilibrium (optimal functioning) or whether their ratios would be positively or negatively biased in respect to the balance point. This study did not provide a clear answer to this question. Overall, the control group demonstrated preponderance of positive over negative thoughts (as expected based on the BSOM model). The BSOM positive bias, however, was observed only on test anxious content and not depressive content, where it approached equilibrium. Such disparity may reflect complexity of variable affecting the BSOM ratios.

5.2.4 Summary

Current investigation offers support for theoretical postulates of the CCS and joint CCS/BSOM models for cognitive facets of test anxiety, depression, comorbidity, and low pathology condition in college women. Successful separation of depressed and test anxious groups based on their respective cognitive output variables serves to strengthen the claim of the cognitive theorists that depression and anxiety can be cognitively differentiated. Further, because depression and test anxiety can be separated methodologically, meaningful examination of other cognitive and non-cognitive differences between the two becomes possible. Cognitive specificity research is expected to lay foundation and provide valuable data for the development of behavioral, emotional, and motivational specificity frameworks for anxiety and depression, many of which are still in the embryonic state. Given the comorbidity of affective disorders in the real world and the complexities of the anxiety-depression relationship, it is evident that valence and cognitive content will continue playing an essential role in their future cognitive accounts, but the situational factors cannot be discarded.

Not only does the knowledge of automatic cognition profiles of depressed and test anxious college women contribute to the understanding of these two disorders, it also has potential treatment implications. Thus, in the following section, the clinical implications of the findings will be explored, including conceptualization and identification of both test anxiety and depression, as well as significance of the results for the treatment of these conditions.

5.3 Clinical Implications

5.3.1 Disorder Conceptualization and Identification

Cognitive content specificity contributes to the clinical field by helping elucidate whether cognitive content measured by self-report instruments is useful in differentiating anxiety and depression. By identifying cognitive products that can be potentially used for setting depression apart from test anxiety in clinical settings, this study suggests that a

clinician can utilize BSOM ratios with relevant disorder content to capture depression and test anxiety. This task is particularly relevant for *depression* in the light of the overlap between clinical mood and anxiety disorders (see Chapter 2) and the *DSM-IV* placing affective and motivational factors at the heart of depressive disorders (in contrast to mostly cognitive factors at the core of several anxiety disorders).

In terms of *test anxiety*, current study attempted to bridge the gap between clinical and psychoeducational fields of study by incorporating a nonclinical disorder within the framework of the clinically-based theory and research. This was accomplished by pairing test anxiety with a subclinical expression of depression. As a result, the test anxious cognitive set mostly succeeded in holding its own against depressogenic thoughts. It may be premature, however, to conceive formulation of test anxiety as a distinct clinical entity because clinical methods were not used to identify its presence, nor was its most frequent clinical correlate (i.e., social phobia) investigated in the study. Given the increasing role of tests in our culture, as conceptualization of test anxiety grows more refined and more is known about its relationship with social phobia, the circumscribed nature of test anxiety is likely to expand to become more comprehensive and applicable to a wider variety of settings and population groups.

Comorbidity findings also hold important clinical promise. Regardless of this study's important theoretical ramifications for those with "pure" depression, in clinical practice the performance of the depression-only group has limited generalization, as depression has been shown to have very high comorbidity rates with various anxiety disorders, including test anxiety disorder (see Chapter 2). Moreover, finding depression in isolation may be even a more difficult task than finding anxiety without depressive symptoms, as confirmed by this study (see Chapter 3). Although this overlap could have resulted from the presence of a test anxiety-activating event in the absence of a depression-activation event, a true co-occurrence of symptomatic depression with test anxiety in a nonclinical population cannot be excluded.

The dysfunctional nature of the comorbid group, which was supported by all three hypotheses (i.e., frequent negative cognitions, low positive cognitions, and relatively low BSOM ratios falling within the most dysfunctional interval), makes this group particularly vulnerable to development and maintenance of clinical-level psychopathology. The presence of depressive-test anxious symptomatology should serve as a red flag for mental health professionals. Specifically, if comorbid condition yields the most cognitive impairment, then it is also likely to be associated with most occupational impairment (including lowered academic performance and dropout), a finding of utmost importance for any college advisor, counselor, or educational psychologist. Psychological and psychoeducational assessments of depression in college students may warrant screenings for test anxiety because the latter may add to the already negativistic profile of depressive cognitions. Early identification of the individuals at risk based on cognitive (as well as emotional and behavioral) symptoms, and the use of preventative interventions are likely to be a key to improved functioning.

5.3.2 Treatment Implications

Conceptualization of test anxiety and depression is closely related to their treatment. Cognitive therapy (CT) has been shown to be efficacious with college students when addressing the symptoms of both test anxiety and depression (e.g., A.T. Beck & Emery, 1985; A.T. Beck, Emery, & Greenberg, 1996; A.T. Beck, Rush, Shaw, & Emery, 1979). Cognitive and cognitive-behavioral strategies instruct individuals that they can alter their thoughts, feelings, and behaviors through self-control. They are taught skills that regulate thoughts and moods, i.e., how to identify and modify dysfunctional thinking, including negative patterns of thinking in specific situations related to depressive or anxiety actions. Common CT techniques include: recoding dysfunctional thinking, examining the validity and basis of each thought, empirically testing beliefs, and practicing more functional responses to those (Jacobson et al., 1996). In therapeutic interventions, modification of cognitions is vital for the immediate alleviation of distress associated with anxiety and depression, as well as long-term preventive goals. Besides

traditional modes of CT, highly accessible cognitive products in depression and test anxiety yield themselves to a computer-based therapy. Characterized by a high attrition rate (Orbach, Lindsay, & Grey, 2007), such type of therapy may be more applicable to test anxiety treatment rather than depression, as depressed patients are characterized by low motivation and withdrawal from many life events (in contrast with test anxious students who tend to withdraw just from evaluation-related situations). Computer-delivered, evidence-based programs in test anxiety (e.g., Orbach et al.) hold promise.

5.3.2.1 Role of the CCS Model

Support for *Hypothesis 1* suggests several important points. First, the respective content of test anxiety and depression likely plays an important role in those disorders. Addressing recurrent themes is a crucial step in cognitive therapy, as those themes lead to the underlying beliefs. Second, addressing frequency of cognitions is equally important for both depression and test anxiety. In terms of valence, if negative thoughts appear to evidence better discrimination power than positive thoughts alone, then the CT practitioner would need to focus on teaching clients to identify crucial negative thoughts and modify those or replace them with more adaptive ones. Furthermore, if positive thinking is as not as specific as negative thinking, then the utility of focusing on positive content in treatment of this disorder is placed under question since it is mostly unique elements of a disorder that guide intervention (Garber & Hollon, 1991; cited in D. A. Clark & Steer, 1996). However, despite its dubious role in disorder differentiation, positive talk can still be useful in therapy. The overall level of positive thinking was low in both test anxiety and depression and much lower than that of controls, evidencing need for intervention. In addition, if positive thoughts fluctuate more and are not part of a rigid cognitive set, they may be more susceptible to modifications than more stable negative thoughts.

Overall, the data imply that it is not sheer presence of the content-relevant thought but also its valence and frequency that are a part of the maintenance of depression and test anxiety. Thus, for a clinician, it is crucial to monitor all these intracognitive

components. Moreover, clinical practice can help guide the theory by identifying other key elements of cognition in mood and anxiety disorders.

5.3.2.2 Role of the BSOM Model

Support for *Hypothesis 2* provides important benefits for the utility of the cognitive ratios in the treatment of depression and test anxiety. On a general note, a concept of balance holds intuitive appeal because there is no assumption about stability of cognitive content but rather that predominance of negatively-valenced thoughts is associated with significant psychopathology, giving a clinician a broader field of content exploration and more content flexibility with the client (Ronan & Kendall, 1997). The BSOM ratios serve as an easy-to-implement method for disorder differentiation, allowing one to intervene with psychopathology earlier. Understanding the role of negativity within the cognitive balance can be useful for some clients who have a difficult time letting go of negative cognitive routines and are prone to cognitive distortions, such as disqualifying the positive, generalization of the negative, etc. Similarly, excessive positivity is not always helpful, as it may be associated with denial and "gloss-over" coping styles; therefore, clients who are typically resistant to identifying any negative thoughts also would benefit from the optimality approach.

Cognitive balance can serve to gauge treatment effectiveness, as it successfully differentiates pathology from normalcy. The SOM/BSOM model can be utilized to visually track the cognitive changes of the intervention either throughout treatment or by taking pre- and post- measurements; thus, lending itself to more empirically-based interventions (Bruch et al., 1991; Ronan & Kendall, 1997). The visual and concrete nature of the model may allow us to reach those with somewhat more limited cognitive skills than what is typically required for successful CT.

5.3.2.3 Cognitive Therapy of Depression

Beck's cognitive therapy (A.T. Beck et al., 1979; A.T. Beck & Emery, 1985) remains one of first-line empirically-supported psychosocial interventions for depression. Within the repertoire of cognitive skills utilized by CT, the primary skill taught is the

STOP technique, a thought interruption method developed by Meichenbaum (1977), which uses audiotapes and written affirmations to combine visual cues with thought alterations in order to interfere with negative thinking. Once the negative flow is interrupted, a more positive thought (or affirmation) is inserted. Aaron Beck postulated that deeply-rooted cognitive structures are at the heart of cognitive therapy. However, some believe that modifying schemas may not be as effective for depression treatment as modifying automatic thoughts (e.g., Barber & DeRubeis, 1989; cited in Teasdale et al., 2002). John Teasdale and his colleagues proposed that it is cognitive products, which are less stable than structures and are activated/become accessible even in mild cases of depression that are crucial for the depression therapy outcome and relapse prevention (Persons & Miranda, 1992; Teasdale, 1983, 1988; all cited in Teasdale et al.). Preliminary empirical evidence appears to be supportive of this hypothesis (e.g., Ingram, Miranda, & Segal, 1998; cited in Teasdale et al.). Cognitive therapy based on this perspective focuses on repeatedly identifying negative thoughts as they arise, and distancing oneself from them to evaluate the accuracy of their content (i.e., 'decentering') (Teasdale et al.).

The above-mentioned cognitive techniques are likely to be beneficial when dealing with depression in college students. Support for cognitive content specificity in the current study indicates that college women with depression would benefit from programming that addresses thoughts with both negative and positive content. These thoughts are reflective of the increased frequency of typically depressive themes of loss and deprivation and low frequency of positive thoughts related to the self, the world, and the future.

5.3.2.4 Cognitive Therapy of Test Anxiety

Psychosocial treatment of test anxiety has changed with each of its new conceptualizations, from relaxation training to systematic desensitization, to attention training, to skills training, to cognitive approaches (Orbach et al., 2007). Treatments corresponding to all these perspectives have been successful in reducing test anxiety, but cognitive therapy alone (particularly, cognitive restructuring) or in combination with

skills or emotion-focused training has worked best in terms of produced effect sizes (for review, see Ergene, 2003; Vagg & Spielberger, 1995). Beck's cognitive therapy model can be successfully applied to evaluation anxieties, including test anxiety (A.T. Beck, 1989; A.T. Beck et al., 1996). In addition to altering their cognitions, reducing emotional arousal of test anxious students via systematic desensitization may also be effective, as it can help lower the frequency of unwanted thoughts and retrieval difficulties that follow (Naveh-Benjamin, 1991).

Similar to depression, cognitive therapy of test anxiety centers on relieving individual of burdensome thoughts, which in turn may interfere with one's ability to perform and/or feel comfortable in testing situations, for example, via increasing self-monitoring and practicing self-control during testing situations. Consistent with the current results, literature supports a selective approach when interfering with positive test anxious cognitions in that teaching positive self-talk has been found to thwart the frequency of negative thoughts only for a select group of highly test anxious college students, i.e., whose cognitive style does not include vivid imagery (Kurtz & Wyatt, 1996). Examination of test anxiety specificity in the current study indicates that the automatic thoughts of college women with test anxiety are marked by high unique negativity in the evaluative domain (including themes of evaluative threat for self, performance, and opinion of others). This could suggest programming that emphasizes the development of less negative thought processes with test anxious content as a primary focus.

5.3.2.5 Cognitive Therapy of Comorbid Condition

Although well researched, comorbidity of depression and anxiety is often neglected in devising treatment plans. Most intervention programs for anxiety and depression target those conditions separately (van Lang et al., 2006). A practice of singling out one disorder to treat also holds true in a larger scheme of psychopathology, despite a widespread preponderance of comorbid conditions and the fact that treating anxiety and mood disorders in sequence is not always efficient in terms of cost and time

(Craske, Anthony, & Barlow, 1997; Foa & Rotnbaum, 1998; Steketee, 1993; all cited in Persons et al., 2006). The issue whether treating clients with a technique for a single disorder is beneficial to them is still being debated. Although comorbid depression may not have a damaging effect on the course of the anxiety treatment, targeting anxiety alone is not likely to result in post-treatment improvement in depression scores (Joormann, Kosfelder, & Schulte, 2005; McLean, Woody, Taylor, & Koch, 1998). Popular cognitive approaches based on Beck's theory, such as Mind over Mood (Greenberger & Padesky, 1995) are suitable for both anxiety and depression. However, the empirical evidence on validating these approaches with college students is yet to be amassed.

The present study did not answer the question as to whether the disorder components need to be treated in sequence or simultaneously, but the performance of the comorbid group across hypotheses suggests that despite the likely primacy of depression in comorbid condition, it is likely that the uniqueness of test anxiety would make it necessary to target its specific content separately in addition to that of depression. These predictions, however, remain but a speculation until further research is done.

5.3.3 Summary

The differentiating role of negative and positive automatic cognitions and their BSOM ratios in the profiles of depression and test anxiety places them at the core of disorder maintenance and alleviation. Cognitive therapy, which involves modifying automatic thoughts, has been successful in treatment of depression and test anxiety separately and can be applied to their comorbid condition. Compared to a traditional focus of treatment on either negative or positive content, cognitive ratios can provide additional benefits in assessment and intervention. The findings highlight the need to improve test anxiety clinical conceptualization and instrumentation, expand cognitive interventions to incorporate BSOM ratios into depression and test anxiety treatment protocols, and continue investigating methods of successful identification and treatment for comorbid condition.

Next, the strengths and shortcoming of the current study are discussed.

5.4 Limitations and Directions for Future Research

The study's limitations have to do with its design, scope, instruments and measurement, procedure, and sample.

5.4.1 Design

In terms of design, not addressing causality has been a criticism of most CCS research to date, as support for the CCS hypothesis "neither rules in nor rules out the causality" of the variables under study (Garber & Hollon, 1991, p. 131). Similar to most specificity studies, this study did not examine causality directly and only looked at the differences between groups. It must be noted that although specificity designs are an important initial step towards the identification of potential causality (Garber & Hollon, 1991), a relationship between the affective state and cognitions is a part of a complex multivariate process, and cognitive variables alone are unlikely to be a sufficient cause of the disorder (Garber & Hollon, 1991; Ingram & Malcarne, 1995). Moreover, since it is well established that psychopathological conditions and cognitive factors are a part of the circular loop, it may be impossible to exactly pinpoint the causal chain. Despite this dilemma, prospective designs should strive to extend current descriptive models to determine if cognition is a part of depression and test anxiety etiology. In the absence of such designs in the area, specificity models do help confirm that cognitive phenomena are involved in the onset and/or maintenance of the psychopathology (Garber and Hollon, 1991). Another design shortcoming was not addressing the temporal component of the anxiety-depression relationship, which has been the focus of recent theoretical work (see Chapter 2). Longitudinal studies may serve to resolve the issue.

5.4.2 Scope

5.4.2.1 Models and Model Elements

Given the success of the present integrative attempt, future research should strive to continue expanding the scope of models examined to explore the commonalities and

differences between depression and anxiety in more depth. For example, specificity models could be augmented by including the measures of general distress and positive and negative affectivity, which would allow one to test for affective and cognitive predictions of the tripartite, CCS, and BSOM models simultaneously. A study by McKellar et al. (1996) suggested that the influence of negative affect may explain the most dysfunctional cognitive thought patterns of the comorbid group. R. Beck et al. (2003) note that most integrative efforts until recently have failed to assess the tripartite model completely in one sample. Moreover, there are several models that yield themselves to CCS and BSOM but have not been investigated extensively (e.g, Lightsey, 1994 a, b). Researchers have suggested that structural equation modeling is better suited for identifying the unique and common cognitive elements that contribute to symptoms and evaluating their magnitudes simultaneously than a methodological strategy of comparing group differences in cognitive content used in this study (Cho & Telch, 2005). Additionally, such approach allows to incorporate continuous assessment of depression and anxiety.

5.4.2.2 Affective Variables

Comprehensive CCS efforts should also consider expanding the scope of independent variables in order to address additional affective confounding issues. For example, the results of the current study were likely to be clouded by comorbidity of anxiety and depression with such conditions as social anxiety and generalized anxiety. For example, it has been shown that social anxiety frequently co-occurs with test anxiety or could be encompassing it (see Chapter 2). Anger is another important variable for cognitive-affective exploration simultaneously with depression and anxiety. In addition to worry and other signs of generalized anxiety, depression is often associated with feelings of hostility (A. Brown & Zeichner, 1989; Fava, Anderson, & Rosenbaum, 1990; Fava, Rosenbaum, Pava, & McCarthy, 1993). Preliminary research on content differentiation of anger, depression, and anxiety with children and adults (Calvete et al., 2005a, 2005b; Schniering & Rapee, 2004) yields optimistic results in that anger can hold its own against

depression and anxiety, despite sharing the overall high negative and low positive cognition profile with it.

5.4.2.3 Cognitive Variables

The present study is further limited by the scope of its cognitive dependent variables. First, only automatic thoughts were explored and no connection was tested to the underlying cognitive structures or processes, which are vital for the CCS models (A.T. Beck, 1976; Ingram & Kendall, 1987; Kendall & Ingram, 1987). A narrow range of cognitive measures is partly explained by shortage of the CCS-relevant test anxiety cognitive instruments that are directly comparable to depression in valence. Schema specificity studies in test anxiety are missing. Due to test anxiety having a strong achievement component, it is of interest to identify what role an achievement schema (an "autonomy" concept in Beck's theory; A.T. Beck et al., 1983, 1987) may play in test anxiety. In addition to schematic differences, the content of cognitive interference in test anxiety and depression is of importance to the CCS hypothesis and needs to be studied (see Klinger, 1996). Overall, future research should strive to establish a link between cognitions and cognitive structures and processes. Researchers are encouraged to expand the range of cognitive variables implicated in the differentiation of test anxiety and depression (see D.A. Clark, 1988) and to devise new test anxiety-relevant cognitive instruments that would tap into its schematic content and allow for the cross-content comparison with depression.

5.4.2.4 Intracognitive Elements

In addition to a limited number of cognitive variables addressed, the present research did not investigate many intracognitive elements besides valence, content, and frequency (with the latter not examined separately from the other two components). Although in the current study automatic thought content was established as a basis for differentiation of anxiety and depression, specific aspects instrumental to the distinction were not identified and may lie outside the sheer content or valence of the automatic thoughts. Such important elements relating to cognitions include: form, intrusiveness,

controllability, intensity, and salience (D.A Clark, 1986; DiNardo & Barlow, 1990; Glass & Arnkoff, 1997). Moreover, recent research appears to be shifting towards the exploration of metacognition rather than surface cognitions. It has been proposed that it is not the content of thoughts per se but the level of endorsement of negative metacognitive beliefs that is more important for differentiation of various anxiety disorders (Wells & Carter, 2000; cited in D.A. Clark, 2001) and pathology from normality (Ingram & Kendall, 1987). Thus, what one thinks may be less important than how one interprets and responds to thinking (D.A. Clark), including such facets of cognitions as unacceptability, believability, and importance.

Secondly, despite promising preliminary results, there potential problem with the BSOM model applied to the CCS of test anxiety, which lies within the concept of cognitive interference. This process is essential to test anxiety and encompasses a lot of neutrally-valenced cognitions, e.g., thinking about members of one's family, about what happened earlier, etc. (see Sarason et al., 1986; I.G. Sarason & Sarason, 1987). It is likely then that neutral cognition could play a role in the cognitive balance of test anxiety or any anxiety disorder that incorporates neutral thinking in its cognitive system. The idea of including neutral thoughts in the cognitive ratios is not new (see Heimberg et al., 1990; Kendall, Howard, & Hays, 1989), but precise ratio structure and parameters unique to this disorder await exploration.

5.4.3 Methodology

Besides the criticisms related to the design and scope, this study has several significant methodological limitations, mostly related to instruments and assessment, group selection, procedure, and sample. Prior to addressing those limitations, the study's contributions must be discussed.

5.4.3.1 Assessment Contributions

In terms of affective assessment, current findings lay groundwork for the utility of the TAI in CCS research and add to the body of nonclinical specificity literature with the BDI-II. In the realm of cognitive measures, the results concur with the position of some

researchers (e.g., Sanz & Avia, 1994) that by using instruments with disorder-specific content one can obtain evidence in favor of cognitive content specificity. Establishing that cognitions play an important role in differentiation of test anxiety from depression should, in turn, have an impact on the measurement of the two disorders, as discriminant validity of instruments of the two disorders can be enhanced by including more cognitively loaded items (D. A. Clark & Steer, 1996).

Moreover, present results add to the existing body of evidence for the use of the ATQ-N and ATQ-P in CCS studies with nonclinical populations (e.g., Bruch et al., 2003; Ingram, 1989a, 1989b; McDermut & Haaga, 1994; Sanz & Avia, 1994). Specificity of the ATQ-N to depressive symptomatology has been challenged by some, as it has been often shown to correlate strongly with a measure of trait anxiety (Hollon & Kendall, 1980) and has not always shown adequate depression-anxiety group differentiation in CCS studies of social phobia (Sanz & Avia, 1994, study 2)**.** However, in this study, it has reliably set apart depressed participants from the non-depressed and test anxious ones and yielded a low correlation with the measure of test anxiety, pointing to its adequate differentiating ability. When measuring positive content, researchers have long expressed doubts about the ATQ-P's specificity to any particular psychopathological state and the CCS research mostly did not find support for the depressive content differentiation (e.g., Bruch et al., 2003; Ingram, 1989a). Contrary to this conclusion, current findings support the measure's adequate ability to discriminate between depressive symptoms and a specific type of anxiety.

In the realm of test anxious thinking, this study provides initial evidence for the validity and differentiating ability of the frequency-version of the CPNT. However, a lack of previous psychometric research for the frequency version of the CPNT results in its limited generalizability. Further studies are required to validate this instrument.

5.4.3.2 Use of Self-Statements

A more general criticism involves the use of self-statement instruments. Exclusive reliance on such questionnaire measures may not be an optimal way to thoroughly test the

underlying cognitive mechanisms (Yee & Vaughan, 1996). A shortcoming of survey instruments is a selective memory bias, i.e., potential inconsistencies due to memory failure (Galassi et al., 1981a; Calvete et al., 2005a). Since the measures were administered retrospectively, it is unclear to what extent the recall of negative or positive content could have been biased by the current emotional state (Galassi et al., 1981a), as a questionnaire approach includes more reactivity potential than other assessment measures (Prins & Hanewald, 1997). Another important point is that restrospective recall is often contaminated by the appraisal of situation and attributions of success/failure, and endorsement is made based on implicit theories of the individual's thoughts and feelings rather than actual cognitions (Prins & Hanewald, 1997; Ronan et al., 1994). Although most of the current data were obtained prior to actual grades announcement and, therefore, might have not been largely contaminated by the students' appraisal of that event, the possibility of biased recall should not be excluded.

Subjects tend to under- and overreport their symptoms and cognitions because individuals often attach a different meaning to the same item. Social desirability of questionnaire measures is often cited as another limitation and may have been at work in this study. Personal meaning of intrusive thoughts is related to how distressing the thought is (Purdon, 2000; cited in D.A. Clark, 2001); thus, retrospective self-report instruments are biased in that respondents tend to suppress the thoughts that are not socially desirable or cause distress. Although the anonymous and computer-based administration (which eliminates viewing the examiner and, therefore, excludes a potential "judging" factor) makes social desirability less likely to be of significance, future use of prospective methods and inclusion of a measure of social desirability would allow to mitigate this problem.

Current categorical nature of cognitive questionnaire measures (i.e., negative or positive valence) has also been criticized by some researchers (e.g., Conroy & Metzler, 2004), who note that applying a dimensional approach (e.g., identifying to what degree the statement is positive or negative) may prove more useful because not all statements

within one category are equivalent. Conroy and Metzler suggest that one potential direction for reconceptualization of self-talk and giving it more personal meaning is the well-researched in psychotherapy and psychopathology circumplex model named the Structural Analysis of Social Behavior (SASB; Benjamin, 1996; cited in Conroy & Metzler). To address the complexity of cognition, rating criteria of self-report measures warrant expansion.

Finally, one should be cautioned that although the presence of differences between depression and anxiety in self-statement cognitions is reassuring, it does not mean that the differences would be found using other types of assessment (Laurent & Stark, 1993).

5.4.3.3 Calculation of the BSOM Ratios

Another assessment issue that deserves attention is the calculation of the BSOM ratios. The ratio calculation method used in this study (see section *3.6.2.2*) is only one of several found in the literature. A variety of the BSOM ratio calculation methods makes a task of cross-study interval comparison and generalization rather difficult, especially in the light of the ratio sensitivity to the assessment method. To address unequal numbers of positive and negative statements, this study has utilized multiplication by a constant (e.g., McDermut & Haaga, 1994). Other methods have included selecting an equal number of items from those that best differentiate pathology from the lack of thereof. In a procedure termed "criterion keying", the items with the highest discrimination ability are chosen based on a statistical test (e.g., t-tests or discriminant function analysis with self-talk as a predictor variable; Calvete & Cardeñoso, 2002; Ronan & Kendall, 1997). Yet another method has to do with "rational" choice (e.g., Calvete & Cardeñoso; Ronan & Kendall), whereby an equal number of items is selected to ensure content variety, based on highest loading on the corresponding factor selected if the items are similar. In Calvete and Cardeñoso's study, rationally-derived BSOM ratios produced the results different from the criterion-keyed ratios, with the latter having more positive average group ratios. It is important to give consideration to the method of the BSOM ratio calculation because it

can impact the parameters of the BSOM interval, as well as the number of participants falling within the specific intervals. More research identifying preferable calculation methods is needed.

The results also highlight that while the BSOM intervals appear to be more accurate in differentiating pathology from normality and capturing "normality" and "pure" conditions, they may be too precise for the higher levels of psychopathology (comorbid condition). One solution could be to address the exact conditions of their original derivation (Schwartz, 1997), including stress level and mood. Theoretical explorations incorporating those confounding factors await development.

5.4.3.4 Intracontent Elements

Whereas many limitations above were related to the breadth of variables involved, current criticism has to do with the depth of assessment and analyses and can be also tied to design (see section *5.4.1* above). There is preliminary evidence that specific content areas within depressive cognitions may be the key to improving the discriminating ability of positive and negative self-statements (e.g., Calvete & Connor-Smith, 2005), as well as the BSOM ratios (e.g., Fichten et al., 1991; Calvete & Cardeñoso, 2002). Both depression and test anxiety yield several intracontent elements but, unlike depression, the elements in test anxious content have not been explored.

Unfortunately, current cognitive scales do not allow for discrimination between various intracontent characteristics of the automatic thoughts, which in turn limits researchers in performing direct group comparisons on those characteristics. Thus, factor analysis followed by content analysis of cognitive measures is often desirable when addressing content specificity. Content exploration studies offer directions for differentiation of anxious and depressive cognitions and their respective BSOM ratios, which may prove useful in devising new theoretical models**.** In addition to intracontent analysis, individual item analysis may be beneficial, as total scores may obscure individual's endorsement of a particular symptom. Furthermore, multidimensional cognitive assessment tools need to be developed and validated for anxiety (for an attempt,

see R. Beck et al., 2003) and possibly for depression. As content heterogeneity is not limited to cognitive measures, isolating subsets of symptoms to examine specificity within those, as opposed to the entire cluster of symptoms can offer yet another strategy for the refinement of cognitive specificity (R. Beck & Perkins, 2001).

5.4.3.5 Group Selection

As it has largely succeeded in setting apart the depressed and comorbid groups, this study adds to the validity evidence in support of empirical cutoffs for depression (A.T. Beck et al., 1996; Dozois et al., 1998). There are several concerns regarding group sorting, however, that are worth noting. Some researchers challenge the accuracy of the cutoff scores, calling for consistent parameters to form groups with depression. For example, a group of researchers suggested that comorbid group is typically heterogeneous; thus, a depression cutoff for the comorbid group should be different from that for a "purely" depressed group, at least in clinical populations (Sloan, Marx, & Bradley, 2002). Further, others challenge the appropriateness of the cutoff scores altogether. For example, Ruscio and Ruscio (2002) conducted an analysis of the latent structure of the BDI-measured depression in a large college student sample, which provided evidence of the dimensionality of depression and against the use of the BDI to classify participants into groups. Further, on a more general note, it can be argued that using cutoffs to put participants in groups with either presence or absence of a certain disorder is a categorical approach and is inconsistent with the literature advocating the use of continuous assessment in disorder identification.

Another issue has to do with control group selection. Individuals with low self-reported levels of depression and anxiety do not necessarily represent a psychologically healthy and/or typical "control" population. In other words, reporting fewer symptoms of depression and anxiety does not guarantee that the group is pathology free, as it may be indicative of a response bias and/or maladaptive coping (e.g., denial), sometimes associated with confounding psychopathologies. Therefore, it may be more prudent to select control group with average levels of internalizing disorders rather than with low

levels. Moreover, although it was feasible in the current study, using a psychopathological control group in addition to nonclinical controls may prove useful.

5.4.3.6 Procedure

In regards to the procedure, a significant limitation of this study was its one-time, single-method, single-measure, single-informant assessment. The present results cannot be generalized easily to the individuals with true psychopathology even on a subdromal level, as symptoms (especially, depressive ones) tend to fluctuate widely, and one-time presence of such symptoms is not necessarily indicative of a disorder. A similar argument can be applied to the cognitive measures. Different findings are sometimes obtained on both cognitive and affective measures depending on the data-recording method (Arnkoff & Smith, 1988; Glass & Arnkoff, 1997). Although pervasiveness of a negative depressive bias has been demonstrated by research (e.g., Persons & Miranda, 1988; Teasdale & Dent, 1987; both cited in Teasdale et al., 2002), given the fluctuation of depression over time and proposed instability of the positive cognitions, multiple-point/multistage, multimeasure, and multimethod approach is advocated in order to improve validity of assessment and its generalization (e.g., Ingram et al., 1987; Laurent & Stark, 1993; Ronan & Kendall, 1997). For example, students can be screened for depression and anxiety first (e.g., for trait symptoms or diagnosis) and then administered the affective and cognitive measures of various types (e.g., self-report and interview); thus, ensuring that depression and anxiety are still present.

In the realm of the BSOM ratios, future studies should explore convergence of different types of cognitive ratios, such as affective and cognitive one or use different BSOM assessment methods, such as Semantic Function Assessment Measure (SFAM, Ingram, 1990; cited in Nasby & Russell, 1997). Given the complexity of the affect-cognition relationship, it is possible that averaging across various BSOM ratios may yield a better overall estimate of the individual's functioning than when relying exclusively on a single type of the ratio.

Next, the specific classes, in which participants were enrolled while completing the measures, were not identified. Certain subject areas, such as statistics, typically engender more test anxiety than others. Statistics test anxiety is prevalent in college students (Onwuegbuzie, 1995) and yields preponderance of women over men (Benson, 1989; Demaria-Mitton, 1987; both cited in Onwuegbuzie, 1995). Thus, the number of students enrolled in statistics courses might have varied across groups and, therefore, led to confounded findings.

Yet another procedural limitation is that the 'before', 'after', and 'before-after' categories of participants were grouped together in order to maximize the number of subjects with test anxiety. Although there were no differences in test anxiety between the participants in terms of the time of test taking, the item content, particularly for the test anxious group, might have meant different things to those subsets of participants because in the 'before' case they were asked about their most recent test, while in the 'after' case they were asked about a specific test they had just taken.

5.4.4 Sample

Caution should be exercised when generalizing from the current sample. First, the data were collected from nonclinical participants, mostly showing subclinical levels of depression. It remains unclear whether the relationship between mild, moderate, and severe expression of depression is linear and whether a disorder expression studied in college students is a part of the same continuum as its clinical expression or is conceptually different, despite recent evidence pointing to the continuity model (e.g., Flett et al., 1997). Thus, generalization of the results to populations other than college students may be limited. What is more, in light of a relatively high number of participants with the scores above "severe" depression cutoff in the current study (which are not typically present in college student studies), one should use caution when generalizing the present results to other college populations. Further studies are needed with test anxiety and depression that would not only tap into cognitive content specificity in clinical versus nonclinical populations and subclinical versus clinical disorder

manifestations, but would also elucidate clinical appearance and levels of evaluation anxiety, which are not currently established.

Next, a narrow age range of the sample, although typical of the studies with students from large urban universities, limits generalizability to other student samples from smaller universities and/or community colleges, where age ranges tend to be broader. The present sample was also restricted to women. A recent review of literature by Simonds and Whiffen (2003) showed that preponderance of women to men in experiencing anxiety alone and comorbid anxiety-depression is more pronounced than for depression alone. Further, women have been found to endorse more anxious and depressed negative cognitions, less positive cognitions, and lower BSOM ratios than men (Armstrong & Khawaja, 2002; Calvete, 2005; Roothman, Kirsten, & Wissing, 2003). Their negative depressive cognitions have been shown to have a different, more complex relationship structure than those of men (Bryant & Baxter, 1997). It has been noted that men may attach more importance to achievement situations that women (Dozois, 2007) despite generally lower levels of test anxiety (see Chapter 2 for discussion). Overall, it is conceivable that men's cognitive patterns may be different from those of women in both "pure" disorder conditions and comorbid conditions. The study awaits replication in the male and mixed-sex samples.

5.4.5 Summary

Despite its contribution to theory, assessment, and treatment of test anxiety and depression, the current research suffers from many limitations typical of the other CCS studies of anxiety and depression. This study and other similar studies would benefit from expansion of their scope, including the use of more comprehensive and integrative approaches while simultaneously assessing unique and common disorder elements, as well as generating complex designs with more affective and cognitive variables. More research depth, including causal and temporal connections, linking cognitive output with structures and processes, and analyzing intracontent differences is also needed. Further, improvements in measurement procedures and innovative approaches towards automatic

thought assessment and conceptualization should be strongly considered. Until this research is augmented and replicated in other samples, caution should be used when generalizing the current results.

5.5 Conclusion

The current investigation is one of very few that address cognitive content specificity of test anxiety, as it compares to another disorder, i.e., depression. In contrast to many CCS studies, which typically focus exclusively on negative thought content, current research zeroes in on both positive and negative content of the two psychopathology conditions. The present study also adds to the limited literature on comorbidity research by including a "mixed" test anxiety-depression group. Its limitations notwithstanding, the study contributes to the refinement of conceptual models in the area of test anxiety by attempting to attain amalgamation of existing theoretical perspectives in the cognitive areas of depression and anxiety. It also aims at engendering interest in the area of test anxiety from a clinical as well as research perspective. This research adds to the body of literature in content specificity of automatic cognition, as it strives to fill the gap in positive anxious content differentiation. Furthermore, it provides information that is of potential benefit to the practice of psychotherapy and counseling, therefore contributing to the improved understanding of test anxiety, depression, and their comorbid condition in the academic environment.

The results suggest that researchers examining cognitive content specificity of specific types of anxiety and depression may want to take into account the Balanced States of Mind model that meaningfully combines positive and negative cognitions. The research also highlights that using specific types of anxiety disorders is beneficial for depression-anxiety differentiation, but the positive anxiety content by itself may not be unique to test anxiety syndrome, as corroborated by many anxiety specificity studies. The data offer support for the utility of applying self-statements to achieve cognitive differentiation of test anxiety and depression. Present findings invite a conclusion that

automatic cognitions relevant to either disorder can be reliably differentiated in a nonclinical population. Cognitive specificity research offers multiple and exciting avenues for future exploration. It is this author's hope that investigators take these opportunities to the next level and build all-inclusive, integrative models of depression and anxiety that avail themselves to stronger generalization and inference.

Appendix A

Test Anxiety Inventory (Spielberger et al., 1978)

Instructions: Listed below are a variety of thoughts, feelings, and behaviors that happen during and before examinations. Please read each item carefully and select *only one answer* choice for each statement out of the following: 1 = "almost never", 2 = "sometimes", 3 = "moderately often", 4 = "often", and 5 = "almost always".

1. I feel confident and relaxed during tests
2. I get uneasy or upset feeling during finals
3. I think too much about grade and it interferes with my work
4. I freeze up on finals
5. I think about whether I'll get through school
6. I get confused when working on tests
7. I think that I am doing poorly and that interferes with my concentration
8. I feel jittery during tests
9. I am anxious during tests, even when I am well prepared
10. I get uneasy feeling before getting test paper back
11. I feel tense during tests
12. I wish exams did not bother me so much
13. I am so tense that my stomach gets upset during tests
14. I defeat myself on tests
15. I feel panicky during tests
16. During tests, I think of failing
17. I worry a lot before important tests
18. My heart is beating fast during tests
19. I worry after exam is over
20. During exam, I am nervous and forget facts

Appendix B

Automatic Thoughts Questionnaire (ATQ-N; Hollon & Kendall, 1980)

Instructions: Listed below are a variety of thoughts that pop into people's heads. Please indicate how frequently, if at all, the thought occurred to you *over the last week.* Please read each item carefully and select only one answer choice for each statement out of the following: 1 = "not at all", 2 = "sometimes", 3 = "moderately often", 4 = "often", and 5 = "all the time".

1. I feel like I'm up against the world.
2. I'm no good.
3. Why can't I ever succeed?
4. No one understands me.
5. I've let people down.
6. I don't think I can go on.
7. I wish I were a better person.
8. I'm so weak.
9. My life's not going the way I want it to.
10. I'm so disappointed in myself.
11. Nothing feels good anymore.
12. I can't stand this anymore.
13. I can't get started.
14. What's wrong with me?
15. I wish I were somewhere else.
16. I can't get things together.
17. I hate myself.
18. I'm worthless.
19. Wish I could just disappear.
20. What's the matter with me?
21. I'm a loser.
22. My life is a mess.
23. I'm a failure.
24. I'll never make it.
25. I feel so hopeless.
26. Something has to change.
27. There must be something wrong with me.
28. My future is bleak.
29. It's just not worth it.
30. I can't finish anything.

Appendix C

Positive Automatic Thoughts Questionnaire (ATQ-P; Ingram & Wisnicki, 1988)

Instructions: Listed below are a variety of thoughts that pop into people's heads. Please indicate how frequently, if at all, the thought occurred to you *over the last week.* Please read each item carefully and select only one answer choice for each statement out of the following: 1 = "not at all", 2 = "sometimes", 3 = "moderately often", 4 = "often", and 5 = "all the time".

1. I am respected by my peers.
2. I have a good sense of humor.
3. My future looks bright.
4. I will be successful.
5. I'm fun to be with.
6. I am in a great mood.
7. There are many people who care about me.
8. I'm proud of my accomplishments.
9. I will finish what I start.
10. I have many good qualities.
11. I am comfortable with life.
12. I have a good way with others.
13. I am a lucky person.
14. I have friends who support me.
15. Life is exciting.
16. I enjoy a challenge.
17. My social life is terrific.
18. There's nothing to worry about.
19. I'm so relaxed.
20. My life is running smoothly.
21. I'm happy with the way I look.
22. I take good care of myself.
23. I deserve the best in life.
24. Bad days are rare.
25. I have many useful qualities.
26. There is no problem that is hopeless.
27. I won't give up.
28. I state my opinions with confidence.
29. My life keeps getting better.
30. Today I've accomplished a lot.

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Vita

Maria Nicholaevna Fishel was born in Moscow, Russia on April 11, 1972. After graduating from high school as a salutatorian, she entered the Moscow State Academy of Management and majored in International Economic Relations. Upon moving to the United States, she followed her heart to pursue a different major and received the Bachelor of Arts degree in Psychology in August 1997 and a Master's Degree in School Psychology in August 2001, both from the University of Texas at Austin. Ms. Fishel is a doctoral candidate in the Department of Educational Psychology, School Psychology Program. After completing her predoctoral internship with Fort Worth ISD, she worked for several years as a school psychologist.

Permanent Address 855 Sunfish
Austin, Texas 78734

This dissertation was typed by Maria Nicholaevna Fishel.